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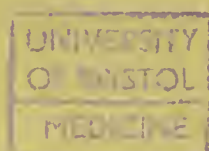
SHEWING
Effectual and Practicable Means for its
PREVENTION AT SEA.
WITH SOME
OBSERVATIONS ON FEVERS,
AND
PROPOSALS

FOR THE
More EFFECTUAL PRESERVATION of the
HEALTH OF SEAMEN.

By FREDERICK THOMSON,
(A SURGEON in the ROYAL NAVY)
Resident at Kensington.

FELIX QUI POTUIT RERUM COGNOSCERE CAUSAS.
VIRG.

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DEDICATION,

BY PERMISSION.

TO THE

Rt. Hon. the EARL of CHATHAM ;
RICHARD HOPKINS, Esq.

The Right Hon. Lord ARDEN ;

The Right Hon. Lord HOOD ;

The Rt. Hon. Ld. Visc. BELGRAVE ;

The Hon. T. T. TOWNSEND, Esq.

AND

ALAN GARDNER, Esq.

LORDS COMMISSIONERS,

For executing the Office of LORD HIGH
ADMIRAL *of* GREAT BRITAIN,
IRELAND, &c. &c. &c.

MY LORDS,

THE Preservation of the Health
of Seamen has justly been said to be

“ *as noble a Subject, as can employ*
“ *the Faculties of Man.*”---But, although much has been done of late Years, towards perfecting the Means of that great National Concern ; yet, certainly, there is still room for Improvement :----and, if I had not been well convinced, that the Means proposed in the following Essay, are more likely to promote this important object, than any hitherto offered ; I certainly should not have presumed to have troubled your Lordships with them, at a time, when the Attention of your Lordships was so earnestly, and so gloriously engaged, in the Direction of the late astonishing, and unparalleled Exertions.

The

The Honor your Lordships have done me, in allowing this Performance to appear under the Protection of your Names, must ever claim my most grateful Acknowledgements.

I have the Honor to be,
With the most profound Respect,

MY LORDS,

Your Lordships most obedient

And most humble Servant,

FRED. THOMSON.

Kenfington,
Dec. 1, 1790.



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E R R A T A.

Page 5, line 4, *for* require, *read* requires.

Page 28, line 15, *after* over, *read* them.

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Page 189, line 13, *for* neither, *read* either ; *for*
nor, *read* or.

ADVERTISEMENT.

IT would appear unnecessary at this time, when the nature and characteristic marks of Scurvy are so well known, to say, that the disease treated of in the following Essay is what is commonly called the *Sea Scurvy*, or *true Scurvy*. But as many still apply the terms *Scurvy* and *Scorbutic* to Herpetic Eruptions, and other diseases of the skin ; such I wish to inform, that there is but one disease which can properly be denominated *Scurvy* ; that it is the same from whatever causes it may arise, and requires the same methods of cure.

The varieties and divisions of Scurvies into acid, alkaline, hot, cold, &c. are too absurd to deserve notice.



P R E F A C E.

A ROUGH Sketch of some of the Observations and Proposals contained in the following Essay was written several years ago ;—but doubting their being worthy the notice of those at the head of the Naval Departments ; having no desire to become an author, nor leisure to pay that attention to the subject which it merits ; and as I was informed about that time, that Dr. Blane intended soon to publish his useful work “ *On the Diseases incident to Seamen,*” the Sketch was laid aside, and I thought no more of it, till within these few months ;
when,

when, in conversation with a medical friend, and a very intelligent sea officer (who is well acquainted with all the means in common use for the preservation of the health of Seamen, and who was lamenting the great mortality in the navy during the late war, on foreign stations)—I mentioned some circumstances, which I thought would be highly conducive to the preservation of the health of Seamen ; of which] they approved so much, that they strongly recommended their publication ; being convinced that they would be useful in the navy, and to East India ships.

As I think it incumbent on every one to communicate whatever is likely to prove of public utility, I immediately drew up a short Memorial on the subject, dated the 19th of August last, which was presented to the Lords Commissioners of the Admiralty.—And now I venture to lay before the Public, not only the contents of the Memorial,

but several other Observations and Remarks on the Prevention of Diseases, and on the Preservation of the Health of Seamen. And as the Scurvy is the malady the prevention of which I have chiefly aimed at, I have thrown the whole into the form of an Essay on that disease.—However, most of the means of prevention which are proposed, will apply equally to the other diseases incident to seamen.

I am sensible that the work is still in a rough dress; and fear it will be found to abound with inaccuracies and imperfections; which, perhaps, more time to attend to the arrangement, &c. of the different parts of the subject, would have prevented.—But, on considering, that if any thing herein proposed should fortunately ever prove useful, the sooner it was made known the better; particularly as, at that time, (September last) immense equipments were preparing
for

for different stations.—I therefore hastened its publication as much as possible.

My intention at that time was, only to publish the Essay on the Scurvy; and the greatest part of that was actually printed off in October; but as, from some unavoidable circumstances, it could not then be immediately completed; and as the state of politics was, at that time, materially changed; I took a little more time, and added the Appendix,

Many things of real use and importance in the preservation of the health of Seamen, might have been added to those which I have mentioned; but as they are so very generally known, I have only cursorily noticed some; and purposely omitted others; wishing to avoid increasing the size of the work with what was not likely to give useful information, at least, to some of my readers.—And as the whole was written during my leisure moments from a pretty active business,

business, I rely on the candor and indulgence of the Public ; and flatter myself, that while its imperfections are overlooked, the motives which induced its publication, will be applauded.

It happened to fall to my lot, during a long service in the Royal Navy, to see more distress and mortality arising from the Scurvy, than from all other diseases and causes united ; and as it appears to me that the prevention of this disease is more within our reach than that of any other, it is matter of surprize that no effectual means have hitherto been discovered ; or, at least, have never been put in practice, for that important purpose ; notwithstanding the subject has been thought worthy the attention, and has exercised the abilities of many ingenious men.

The principal cause of failure seems to be, that while they were endeavouring to find out specifics for the prevention and cure of
the

the disease, which might be compressed into a small bulk ; they did not pay sufficient attention to the material circumstance, which was most likely to prevent a degeneracy of the fluids, and to preserve the blood and juices in a healthy balsamic state ; namely, a wholesome nutritive diet.—For, it appears necessary, in order effectually to obviate the disease at sea, that the preventives should be swallowed by pounds, and quarts ; and not by drachms, or ounces.—Where, indeed, vegetables or acid fruits can be procured in their recent state, particularly lemons, limes, or oranges ;—a small quantity of these, daily used, will generally prevent the Scurvy ; but that will not be found to be the case with any of their preparations, unless very liberally allowed.

I have elsewhere mentioned several instances of the destructive ravages of the Scurvy ; therefore, at present, shall, only notice its prevalence in the fleet, commanded

manded by that gallant veteran, Lord Rodney, in the West Indies, last war.—Where, notwithstanding the utmost attention of the commanders, officers, and surgeons; assisted by the advice and abilities of Dr. Blane, Physician to the Fleet; it appears by the returns made to that gentleman by the surgeons of the different ships; that, of the three diseases, which he very properly calls the *Sea Epidemics*, viz. Fever, Flux, and Scurvy; the total number of sick; of those sent to the hospital; and of those who died on board of twenty-one ships of the line, and three frigates, in the course of five months; a much greater number were afflicted with the Scurvy than with any other disease.

The following extract will shew the proportion of the Scorbutics, to those ill of other diseases.

b

Extract

Extract from Dr. Blane's fourth Table, shewing the total number ill of each disease; the number sent to the hospital; and the number of those, who died on board the fleet, in the months of February, March, April, May, and June, 1781.

Fever.			Flux.			Scurvy.		
On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.
663	73	62	1028	219	60	1844	1033	89

Hence it appears that at the above period, the number of Scorbutics were more than equal to the number ill of the other diseases united; and that, although a warm climate is by no means favorable to the production of Scurvy; yet, that *even there*, it exerts its

baneful influence and deleterious effects; many other instances of which, might easily be produced.

It was a most fortunate circumstance for this country that the fleet became more healthy afterwards.—We are informed by Dr. Blane, that in April 1782, (the month, in which was obtained that memorable and glorious victory, which decided the sovereignty of the seas; the fate, not only of our West India possessions; but, perhaps, eventually of these dominions;) “*Every ship, except two, might be said to be healthy; most of them complete in men, well appointed with officers, and well found with stores and provisions.*”

What appears to be the principal cause of this superior degree of health, was, that “they had just received from England a fresh supply of provisions, among which was *four kraut, molasses, and essence of malt;* all in addition to the ordinary articles of

“ victualling.”—The Doctor mentions some other causes, which, no doubt contributed to the healthiness of the men ; *viz.* that some ships were supplied with wine in the place of rum ; the weather being for some time dry and fine, consequently the men suffered less from exposure and want of sleep—(the necessary consequences of keeping ships clear for action for several days and nights together) and the effects of success on the spirits of the men.

Had our fleet been as sickly at this time, as it was even at the same season of the preceding year, it is possible that the event of the battle might have been different ; at least, the victory might not have been so complete.—For, on such occasions, ships being short of their complement of effective men, must in some degree retard their operations, and, in this instance, might have given such a check to the exertions of the fleet, that even the intrepidity and spirited }
example

example of the commanders could not have compensated.

If we reflect but for a moment on the consequence of a failure at this time ; and suppose, that the Spanish and French fleets had formed the junction which was intended, and most probably would soon have happened, had not this signal defeat taken place ; in that case, their superiority would have been so great that they could have met with but little opposition in those seas, consequently our West India Islands would have fallen an easy prey ; and had those two powers, *elated with success*, in conjunction with their allies, followed the blow ; what the consequences to this country would have been, I shall not pretend to determine ; but from these reflections the great importance of an earnest and unremitting attention to the preservation of the health of our Seamen is evinced.

The above circumstances of the fleet having just received a fresh supply of provisions, with the addition of three excellent antiscorbutic articles, in sufficient quantity to be distributed freely among the people; and the effects of these in preserving the health of the men, are strong proofs of their great utility.

Was it necessary to produce any farther proofs of the salutary effects of the above additional articles of provisions, I might mention the instance given by Dr. Blane of the *Formidable*; which ship being furnished with four kraut, molasses, and “an entire supply of good wine in place of spirits,” did not lose a man by disease from December 1781, to May 1782; and only thirteen were sent to hospitals, whose complaints were small pox and ulcers.

The Doctor likewise remarks of the above period, that, “in the rest of the fleet the health was in proportion to the wine
“and

“ and other refreshments ; and the cleanliness, good order, and discipline observed.”

I confess it was with great diffidence and reluctance, that I entered on the arduous task of writing on a disease which has employed the pens of many learned and ingenious men ; but when I reflected on the alarming mortality among our Seamen during the three last wars ; and that several British ships of war on foreign stations actually lost by diseases the whole of the complement of men they carried out, exclusive of those killed in action ; I was prompted to offer those means which appeared to me the best calculated to prevent such mortality in future. And now that the hurry and bustle necessarily attending preparations for hostilities are over ; and we have the happy prospect of enjoying the blessings of peace ; there will be time and leisure for making a fair trial of those means, and for improving them.—And we have
this

this consolation, that under the best of Kings, and of such an Administration as the present ; there is every reason to expect (as far as human abilities can either plan or execute) whatever may tend to promote the comfort and happiness of the people, and the prosperity of these dominions.

AN
ESSAY
ON THE
SCURVY, &c.

INTRODUCTION.

HAVING had occasion in the course of many years service in his Majesty's navy to see numerous instances of the dreadful ravages of that destructive malady, *the Scurvy*, among the seamen, I could not but lament, that some certain, and easily practicable, means of prevention had never been discovered, whereby the lives of num-

B

bers

bers of that brave, and (to a commercial country) inestimable, class of men might be annually preserved, and rendered more comfortable.

Many ingenious proposals, useful discoveries, and truly valuable improvements, have of late years been made with a view to preserve seamen from this disease: but still it appears, that the means hitherto adopted are inadequate under certain circumstances; and that the Scurvy never fails to make its appearance, when men are long exposed to the causes which produce it; notwithstanding the utmost exertion of the Surgeon, and the diligence and attention of the Captains and Officers, to the means, *in general*, in their power, on board ships of war.

It is for these reasons; and being conscious that every endeavour to prevent and remedy Scurvy in our fleets must be approved of by all; but particularly by those, who have been witnesses of its baneful effects; that I have presumed to offer some observations on this subject; which, if attended to, and liberally put in practice, I flatter myself will not only be found highly useful,

useful, but, in all probability, *effectual*, in preventing that loathsome disease:

The melancholy accounts that have been published,* and the narratives that have been handed down to us, of the tragical effects

* To recite the numerous instances that are recorded of the destructive ravages made by this disease, both at sea and on land, would be tedious and useless; therefore I shall not attempt it. It has been said, and I believe with truth, that during the war before last more British seamen were destroyed by the Scurvy alone, than by the wreck of storms, and the united efforts of our combined enemies.

The numbers, who died of fevers and fluxes, were very considerable; particularly in the East and West Indies; but neither of these diseases were so fatal as the Scurvy.

During the last war, the Scurvy prevailed greatly in the fleet under the command of Sir Edward Hughes in the East Indies; and may be accounted one material cause of the want of success in that quarter of the world. I was informed by an Officer, who served in that fleet, that the crews of almost all the ships were so weakened by the Scurvy, that, on every occasion when they came to action, they had not men sufficient to man their guns; but particularly that in the last action not one ship in the British line had men nearly sufficient to manage the guns properly, so many were ill of the Scurvy.

effects of Scurvy in numerous nautical expeditions and long voyages, during the present and two last centuries, are truly shocking to humanity ; and ought to excite the
utmost

The Scurvy prevailed likewise considerably in the fleet under the command of Admiral Biron, when it arrived on the Coast of America in 1778 ; owing to their having had a series of wet, stormy weather ; and the ships not being supplied with proper preventives.

To shew the effects of this disease on shore, I need only mention the dreadful ravages made by the Scurvy among the Imperial troops in Hungary, as related by Dr. Kramer (1737, *Dissertatio Epistolica de Scorbuto*), the accounts of Scurvies which afflicted the Russian armies between the years 1732 and 1744, as given by Dr. Nitzsch ; likewise the accounts given by the same author (*Treatise on the Scurvy by Abraham Nitzsch, 1747*) of the distresses occasioned by this disease in Finland, at Wiburg, at the siege of Asoph, &c. &c.—The fatality occasioned by the Scurvy among the besieged at Thorn, where “ upwards of 6000 of the garrison, besides a great number of the inhabitants died of this distemper,” (*Observationes circa Scorbutum Auctore Johannes Fred. Backstrom.*) Those instances are recorded by Dr. Lind, together with several others, in his *Treatise on the Scurvy*. And, to come nearer to the present period, the numbers who suffered by the Scurvy at
Quebec,

utmost attention, not only of Government ; but of every individual employed in the direction, management, and care of seamen—That policy, as well as humanity, require it, is evident ; for it is certainly politic to take care of those brave fellows who protect our commerce ; and who fight our battles, when our Country and our Liberties are threatened by ambitious neighbours.—Those heroes, who, at the word of command, hurl death and destruction against our enemies ;—Those valiant and undaunted seamen, to whom we must naturally look up, in time of war, as the bulwark, nay, as the *guardian angels* of these dominions.

As to the share which humanity ought to have in this business, I hope it is not necessary to explain, or to enlarge on that part of the subject ; for whoever will take the

Quebec, Mahon, Gibraltar, &c. are instances, (besides many others which might be mentioned) sufficient to prove the mortality among the human species, occasioned by this disease, on land.

Sir Richard Hawkins, in speaking of the Scurvy, says, that in the course of twenty years, he knew of 10,000 men who had died of the Scurvy.—Sir Richard lived in the former part of the last century.

trouble to consult his own breast, as to the propriety, or even necessity of it, will there find sufficient conviction. And if any thing I can propose, from the observations I have had opportunities of making, should prove in the least useful in rendering the lives of seamen more comfortable; or in obviating disease; it will afford me the highest satisfaction.

To those who have not sufficiently considered this subject; and who may think, that as our navy has gone on tolerably well for many years, with the present mode of victualling, &c. there is no necessity for a change; I shall only say, that if they will take the trouble to reflect on the accounts given us of Lord Anson's voyage, in which he lost above four-fifths of his people by disease, *chiefly Scurvy*; of the expedition against Carthagena, under the command of Admiral Vernon in 1741; of D'Anville's melancholy disasters in 1746; with many other instances which might be mentioned, of naval expeditions, recorded in history, which have failed entirely on account of the sickness and mortality which prevailed; and that the most common, as
well

well as the most fatal disease, has, in general, been the Scurvy; let them but reflect, I say, on those tragical events; and only consider, that, if this disease can possibly be prevented by any means within our reach, it will certainly appear incumbent on every person to contribute, to the utmost of his power, to the accomplishment of so important, so desirable an object.

—Quibus hunc lenire dolorem

Possis, et magnam morbi deponere partem.

HOR.

I shall only make one other observation on this subject; which is, that, if we were to consider seamen merely as a commodity; and estimate them according to the expences incurred in raising them; the expediency of a strict attention to every circumstance relating to their healths can be made evident, even on œconomical principles, independent of political, humane, or moral considerations. This may therefore afford us another argument, if necessary, to shew that the health and lives of those useful fellow-subjects *claim our particular attention*: and I hope to make it appear, that the Scurvy

may, *almost to a certainty*, be prevented at sea; and other diseases rendered much less frequent; and this, with less expence and trouble, than what are usually bestowed in recruiting the loss of men, occasioned by disease.

Although much has been written on the prevention, &c. of Scurvy;* and I am aware that the nature and treatment of this disease are well understood by the Gentlemen, in general, who are at present employed in the care of seamen; yet as it appears to me, that there is still much room for improvement, particularly in the means of prevention; I shall

* Among the Publications which have appeared on the Scurvy, a Treatise written by the judicious and indefatigable Dr. Lind stands foremost—indeed it appeared to me, when I first read it, to comprehend every thing worthy of notice in this disease; and to have entirely exhausted the subject. But notwithstanding the high estimation in which that Work was; and still most deservedly continues to be held; yet, many publications have since appeared, which treat of Scurvy; and which have, in general, contributed to the perfection of the preventive and curative plans.

In

shall take the liberty to make some observations on that subject; and to offer some proposals, which, I flatter myself, will be thought worthy of attention.

Some things will be proposed as improvements in the means of preserving the health of seamen, which, as far as I know, are new; and which, if not adopted, and put in practice exactly as they are here recommended; will at least, I hope, afford hints to others for improvement.

Other circumstances are mentioned, which have been recommended before; but have not been sufficiently attended to; and many are necessarily noticed, which are, and have long been, in daily use in the navy.—However, as utility is my aim; and the health

In a most valuable and useful Work, published in 1785 by the ingenious Dr. Blane; there are many important practical observations on the Scurvy, and on the other diseases incident to seamen. This Work proves that his judgement, his zeal and industry in the treatment of those diseases; as well as his indefatigable attention to their causes, and the means of obviating them, were fully equal to the very extensive field for observation, which fell to his lot.

Those books ought to be in the hands of every sea surgeon.

and

and comfort of seamen of all nations ; but more especially those in the British navy, are objects, I most earnestly wish to promote ; I think it of no consequence whether I may be considered as the first proposer of any improvement, or not. Where true benevolence, not the hope of fame or reward, constitutes the prime motive, and ultimate object, there will be little contest for the credit of discovery or invention.

SECTION I,

Diagnostic Signs of SCURVY.

THE phenomena of Scurvy are the same in all climates; and are, in general, so well understood by medical men, that it would appear unnecessary to enumerate its pathognomonic symptoms: but, lest this little performance should be honoured with a perusal by any, not well acquainted with the nature of the disease, I shall just mention its general appearances and progress.

The countenance becomes pale, fallow, and bloated; the patient has a sensation of languor or lassitude, with debility, and aversion to motion; the gums itch, swell, become red and spongy, and frequently bleed on being in the least rubbed; the breath and urine are foetid; the skin is, in general, smooth and shining, but sometimes it is rough, and has the appearance of goose-skin; livid and black spots of various sizes, vibices, or ecchymoses, are observed
on

on the legs, thighs, and sometimes on other parts; there are pains in different parts, particularly in the legs: in some, the flexor tendons, and other parts about the hams, begin to contract and swell, and the legs and ancles swell considerably, particularly towards night.

“*Vires acquirit cundo*” may be said of this disease, with as much propriety as of any—For, in the progress of the Scurvy, all the above symptoms increase; with hæmorrhages from the nose and gums; sometimes from the lungs and intestines; considerable discharge of saliva; increased debility, with a disposition to faint; impaired vision, or rather intermitting or periodical blindness;*
putrid,

* I never observed this symptom, except in two men on board the *Richmond*, in the beginning of the year 1777; when the crew were afflicted with the Scurvy to a very high degree, in a cruise on the Coast of America; a general account of which will be given hereafter.

A marine, in the last stage of Scurvy, complained in the evening of uncommon anxiety, difficulty of respiration, giddiness, and nausea, attended with pain and heaviness over his eyes; he soon after complained of dimness of sight; and, as if clouds were passing before
his

putrid, foul ulcers form on different parts, particularly on the legs, which frequently bleed ; the legs increase in size, appear œdematous,

his eyes, which gradually increased till he became totally blind, or nearly so ; for he could distinguish candle light from total darkness—the pupils were considerably dilated. Next morning, to his surprise, he found he could see pretty well ; although his sight was still rather imperfect, and continued so all the day—but in the evening he again lost his sight ; and this impaired state of vision, or rather periodical blindness, continued for a week, when he died.

The other instance was in one of the Quarter-masters, who was upwards of fifty years of age ; and had the Scurvy to a considerable degree, but still kept his watch regularly : his sight failed him rather suddenly one evening while he was on deck ; after some exertion in assisting to work the ship, and getting wet, he complained of giddiness, head-ach, and oppression about the præcordia. Next morning he could see as well as usual ; but in the evening became almost blind again : and this intermitting kind of complaint continued till we got to New York ; where, we arrived five or six days after this uncommon symptom appeared ; and the man being sent on shore, recovered.

Both these men were blistered behind the ears, and betwixt the shoulders ; their bowels were kept open, and they had what cordials and antiscorbutics could be pro-

matous, and become stiff and hard, with a sense of weight in them; cicatrices of former wounds or sores are dissolved, and ulcers are

procured for them; which, alas! at that period were but few; I might indeed say, with truth, there were not any on board, at that time, likely to be of service to them.

Dr. Blane is the only author I know of who mentions this as a symptom of Scurvy. A dilatation of the pupils I have observed several times in Scorbutics; but among the immense numbers I have seen with that disease, I never observed that periodical blindness, except in the instances mentioned above.

This appears to be what is termed Nyctalopia by ancient writers, although their definitions of the disease appear extremely contradictory.

Hippocrates says, οἱ δὲ τῆς νυκτὸς ὀρεῶντες οὐς δὴ νυκταλωπας καλεομεν.

Prædict. L. ii. fol. 110. Ed. Foes.

“ Those who see by night we call Nyctalopes.”

P. Ægineta explains the disease, Νυκταλωπα λειψσιν όταν συμβῇ τὴν μὲν ἡμέραν βλέπειν. δυομένου ἡλιος ἀμαυότερον ὄραν· νυκτὸς δὲ γενομένης οὐδαμῶς ὄραν.

Lib. iii. Cap. 22.

Nocturna cæcitas dicitur, quando per Diem homo cernit, Sole occiduo obscurius, Noctu vero omnino nihil.

Galen

are formed on the parts, which discharge a thin, fanious, fœtid matter, or ichor; and

Galen defines the term Νυκ᾽αλωπεία, “*Night blindness*”—

Οἱ τῆς νυκτὸς ἄλαιοι, Noctucæci et Nihil Videntes.
Foef. in Oeconom. Hippocr.

Pliny observes, that the Νυctalopes of the Greeks, or what the Latins call lusciosos, see by day; but in the evening, or at night, they become blind—

“Interdiu quidem videre, sed Noctu Vesperive
“Nihil.” Lib. viii.

Festus says, “they see better by night than by
“day.” Foef. ut supra.

Celsus speaks of this disease under the title of *Imbecilitas Oculorum*; and says, that “they see well by day, but at night they are blind.” His words are,—*Imbecilitas oculorum, ex quo quidem interdiu fati, noctu nihil.*

Lib. vj. Cap. 6.

It appears difficult to reconcile these very contradictory descriptions of the *Nyctalopia*; and the only way, in which it can be done, is by concluding the disease to be an intermittent, (which it certainly is) and that the periods of the access were different; viz. in the patients from whom Hippocrates and Festus took the description of the disease, the paroxysms commenced in the morning, and continued all day; and in those who came under the observation of P. Ægineta, Celsus, &c. the blindness came on in the evening, and continued all night.

within

within these ulcers there is frequently generated a fungous, fleshy, kind of substance, somewhat resembling coagulated gore; and which has been compared by the sailors to bullock's liver.

In this stage of the disease the gums are putrid and swollen; so as almost to cover the teeth; the teeth become loose, and sometimes fall out; and the patient is generally incapable of taking any kind of nourishment, but what is very soft or liquid.

They are prone to faint on the least motion; and, on being exposed to the fresh air, it frequently happens that they instantly expire. Any violent unexpected noise, as the firing of cannon, &c. frequently occasions syncope, and even, sometimes, instant death.*

The contraction about the knees generally increases as the disease advances; and it often happens that those, who are so unfortunate as to have this symptom, have their knees become entirely rigid.

* I have seen several instances, both of syncope, and sudden death, in persons in the last stage of the Scurvy, from the shock occasioned by the firing of guns.

Some

Some are afflicted with dysenteries, at which time their stools are extremely offensive, and generally mixed with blood—in others, the gums become deeply ulcerated, and have a great tendency to gangrene; while many complain of dyspnœa, or difficulty of breathing, attended with a most distressing sensation of tightness across the chest, and troublesome oppression.

I might mention several other symptoms which sometimes attend the advanced stage of this disease; indeed a variety of anomalous symptoms may reasonably be expected in various constitutions and circumstances; but the symptoms above enumerated, or a very small number of them, are sufficient to distinguish this disease from all others.

S E C T. II.

P R O G N O S T I C S.

THE prognosis in this disease must depend on such obvious circumstances, that I shall say very little on this head.

Whether persons afflicted with Scurvy are likely to recover sooner or later, or not at all, must depend on their being liberally supplied with the most powerful antiscorbutics, as, acid fruits, fresh vegetables, wine, porter, &c. before the disease is too far advanced; on the state of the atmosphere, and season of the year; whether wet and cold, dry and warm, &c.

In forming a prognostic much will depend likewise on the present stage of the Scurvy, and whether the patient is able to use exercise in the open air, as this will contribute greatly towards recovery; for when confined to bed, or unable to move about, from weakness, contracted knees, swelled legs, &c. there will be much less chance of recovery.

It

It should likewise be considered whether the patient has generally been subject to scorbutic indispositions; whether it is a constitutional disease, or only brought on by a long continuance of defective diet, and other causes productive of Scurvy; or whether he has been previously debilitated by fever, flux, a too free use of mercurials, &c. &c.

When there is a natural tendency in the constitution to Scurvy, or when the body has been much reduced by disease, the recovery will be more slow and difficult.

The circumstances of men dropping down dead, on any exertion; or on a sudden change from a confined, to free cool air, is not easily foretold; but it is always to be apprehended, when they are affected with the disease to any considerable degree.

It sometimes happens that men who have but very little appearance of Scurvy, are suddenly affected with some of its worst symptoms.

Persons deeply affected with the Scurvy, whose breasts are much oppressed, and breathing difficult, with stitches in the sides; frequently become consumptive, or dropsical, or their legs swell, become œdematous

or ulcerated—and during the remainder of their lives, they are subject to violent rheumatic pains, rigidity of the joints, cutaneous eruptions, &c.

There are innumerable instances of the Scurvy being cured on board of ships both at sea and in harbour, where the disease has been but slight, the people able to use exercise, and where they have been supplied with plenty of acid fruits and vegetables.

Foul ulcers often remain on the legs, and are very difficult to cure; the gums frequently retain the effects of the disease during life, by being either so corroded as to leave the teeth almost bare; or being spongy and swelled so as to cover the teeth too much, and to bleed on the slightest touch.

People who have been afflicted with the Scurvy, are afterwards much more prone to the scorbutic diathesis, *cæteris paribus*, than those who have never been scorbutic.

S E C T. III.

Pre-disposing Causes of SCURVY.

THE pre-disposing, antecedent, or remote, causes of Scurvy are various, and are in general so well known, that I shall not dwell on this subject; but shall only mention the chief and most usual pre-disposing causes, without attempting at present to account for the manner in which they produce their effects.

The principal pre-disposing causes of Scurvy are, a state of body impaired by preceding illness, particularly by fever; cold and moisture;* a long continued exposure to moisture even in warm weather; living much on salted meats, or meat which is nearly in a putrescent state, without vegetables; food† of

* Dr. Lind says, that the *principal and main pre-disposing cause of Scurvy* is a manifest and obvious quality of the air—viz. *its moisture*.

† The most fatal diseases of seamen, are the Scurvy, and Fevers of the putrid kind; and these

of difficult digestion, containing but little nourishment, and not perspirable ; the want, or excess* of exercise ; confinement ; despondency, or a gloomy state of the mind ; slothfulness, and want of cleanliness.

Intermitting complaints of long continuance, and a free use of mercurials, have

arise, in general, from a moist atmosphere and unwholesome diet—the first, or humid air, particularly if confined, is perhaps the most powerful pre-disposing cause of putrid diseases ; and when improper aliment concurs, it never fails to produce them.

When it is in our power, we ought, as much as possible, to vary the diet, according to the state of body, the seasons, and the climate.—In cold climates the most wholesome and nourishing diet is a due mixture of vegetable and animal food—In hot climates, the aliment ought chiefly to consist of vegetables ; for in those climates, even when the body is in the most healthy state, the humours have a tendency to become putrid ; and this is best prevented by good, fresh, nourishing diet.

* Excess of exercise or fatigue, has been accounted a cause of Scurvy—I cannot say that I could ever trace the disease as originating from that cause ; a proper degree of exercise is of the greatest use in preventing a scorbutic indisposition ; but I can easily conceive, that excessive fatigue, from inducing debility, may concur, with other causes, in producing it.

been

been observed to dispose the habit in a particular manner to the scorbutic diathesis.

Foul, confined, air has been supposed to be a frequent cause of Scurvy; and no doubt it will concur with other circumstances to produce it; but as I have always observed, and I believe, it has generally been remarked, that this kind of air is more commonly productive of putrid, malignant fevers; (or, what is called the jail, hospital, or ship fever) I shall not mention it as a *particular* pre-disposing cause of Scurvy.

Many other adventitious or accidental pre-disposing causes might be enumerated; which, besides those already mentioned, are favourable to the production of Scurvy, particularly with the concurrence of sea diet, or gross, vitiated aliment; but this last, with long exposure to moisture combined with cold, and the want of fresh vegetables, may be deemed the principal pre-disposing causes of this disease.

S E C T. IV.

Proximate Causes of SCURVY.

THE proximate cause of Scurvy is said by some to be a considerable change in the fluids ; and, as proofs, they mention the state of the blood drawn from the veins, and the state of the different excretions, &c. in scorbutics ; their blood being more or less in a dissolved state, and much more saline, than the blood of persons free from the scorbutic taint.

Others contend that the Scurvy is not a disease of the fluids ; that its seat is in the muscular fibres ; that its proximate cause consists in a gradual diminution of the vital power, occasioned by the remote causes of this disease ; that the torpor, languor, debility, &c. observed in all the functions, are the first effects of the proximate cause, viz. the diminution of the vital power ; and that the subsequent diminished cohesion between the particles of the muscular fibres, and the

ten-

tendency of these to putrefaction, are links of the same chain, and are ultimately derived from the same source.

I shall not pretend to decide which of these theories is best founded: indeed it appears to be no very difficult task to reconcile the two opinions; as, when the solids are much affected, and the vital energy weakened; the fluids must necessarily undergo some change; and *vice versa*; so that it may not always be easy to know which of them are primarily affected—but, as this seems of little consequence in practice, I shall take no farther notice of it.

In order to illustrate the pre-disposing proximate, and immediate, causes of Scurvy at sea, it is only necessary to describe the nature of seamen's diet; the variations they are subject to from the nature of their duty in different climates; and the state of the air they live in, when on duty, and when at rest. A concise description of these circumstances will enable us to conceive the changes, their constitutions are liable to; changes productive of dreadful havock in the human frame; and of symptoms extremely distressing, and often difficult of relief.

It

It is an unfortunate circumstance, that even while seamen are in port, the excesses they are too frequently guilty of; and the duties they are often necessarily employed in, enervate the constitution, and dispose to a scorbutic intemperature. When at sea, their labour is not hard in general, but they seldom sleep more than twelve hours in forty-eight; and that time is divided into small portions — but what is greatly to be lamented is, that even the time of repose designed by the Author of Nature, to refresh and recruit the body, greatly contributes to a scorbutic disposition, from the nature of the place they sleep in.

Without entering into a detail of the circumstances and temperature of the atmosphere at sea, in different climates and seasons; let us suppose 200 men at a time, sleeping between decks, with every place so shut up that there is as little air circulating as it is possible for men to breathe in; and that air thick, humid, and replete with effluvia arising from dirty, sweaty bodies, and vitiated pulmonary secretions; add to these the exhalations and vapours from the bilgewater and ship's hold. Suppose these men,
after

after having lain four hours in this situation, to go on deck half cloathed ; or at least their cloaths half put on ; in the night air, cold, damp, and chilling ; any person acquainted with the texture of the animal solids ; the nature and cohesion of the fluids ; the manner and incessant flow of the secretions ; the necessity to health of their being free and regular, and the consequences of their obstruction ; whoever, I say, knows and considers these circumstances, and reflects on the manner of life above described, as far as it relates to exercise, the duration and place of rest, &c. will easily conceive why seamen are so disposed to Scurvy ; and why it should appear with such variety of symptoms.

I might enlarge considerably in this description, and might mention the situation of seamen in tempestuous weather ; when the spray of the sea, raised by the violence of the wind, is driven and dispersed over the whole ship, so that the people breathe, as it were in water, for days or weeks together : to this we may add, the sea breaking in upon the decks ; wetting those on duty, as if they were ducked in the sea ; quantities
of

of water frequently pouring down the hatchways, and, from the labouring of the ship, the decks leaking so that the men's bedding, cloaths, &c. are often wet, which they have no opportunity of drying, perhaps for some weeks. The condition of the poor men at those times is not at all enviable. The hatches must necessarily be kept shut; and, there being neither fire nor sun to exhale the moisture, this humid, stagnating, confined, air below becomes most intolerably offensive; yet in this same moist, offensive air, are the men obliged to sleep, in wet cloaths and damp beds; the decks covered with water below them, as well as over him; frequently water leaking down on them; and there they are to remain four hours at a time, till they are again called up to fresh fatigue; and again exposed to the washings of the sea, and rains. A continuance of such weather seldom fails to induce a scorbutic diathesis; and fevers of the malignant kind are often produced by the humid confined air betwixt decks; as was the case on board the Tartar.—For an account of which see the Appendix.

Sup-

Suppose men in the circumstances above enumerated, using a diet of unfermented bread; of salt, hard, rancid flesh, frequently verging on putrescency; of peas and oatmeal, (substances rather inert, and not easily soluble in the stomach) of butter, cheese, and small beer.—Butter and cheese indeed are supplied in such small quantities, that they can have but little influence on the health of seamen; and the beer, though an excellent antiscorbutic, is generally so very small; and the quantity supplied so soon expended, that it is far from being sufficient to prevent Scurvy in a long cruise or voyage.*

In

* “*They order this matter better in France.*”—When this assertion has relation to naval matters, the ideas, which will naturally associate themselves with it, must be rather humiliating to a British Monarch, and to British subjects; whose pride and glory the navy is, *or ought to be*; but particularly so at this time, when we undoubtedly have the finest, best appointed, and I believe I may add one of the best supplied fleets, the world ever produced.

Yet, notwithstanding this, I believe there is reason to imagine that the means practised in the French marine for the preservation of the health of their
sea-

In such circumstances, and from such materials, it is easy to imagine how viscid (from long use how vapid) the chyle must be ;

seamen ; and particularly for restoring health to the sick and convalescents ; are, in many respects, preferable to the means, which have, in general, been used on board of British ships of war ; and this is chiefly owing to the mode of victualling, and the greater proportion of light, vegetable, nourishing diet, with the use of wine, on board of French ships. This is an unpleasant reflection to those, who are interested in the comfort and happiness of British seamen ; but I think it right to be mentioned, as I wish to stimulate, excite, or invite, attention to those important objects ; and what gives some cause for the above idea, is, that the French squadrons in the East and West Indies during the late war were in general much less afflicted with diseases, *particularly the Scurvy*, than the British. The squadron commanded by the Comte D'Estaing arrived on the Coast of America in 1778 without a scorbutic on board ;—whereas, in that commanded by Admiral Biron, which arrived immediately afterwards, there were great numbers afflicted with the Scurvy, and some of the ships were unserviceable from this disease only. This was partly owing to the English squadron having crossed the Atlantic in a higher latitude ; and having more wet, tempestuous, weather, than the French fleet met with. But the principal cause of the Scurvy in this, as in all other instances, was the want

be; with what difficulty assimilated, and indeed how unfit for assimilation. Hence will arise a defect in the progress of chylification,

want of vegetables, of wholesome nourishing diet, and of fermented drink. Had each of those ships been supplied with a few tons of porter; or with materials for preparing wort, spruce beer, or treacle beer; or had they even been provided with a proper quantity of four kraut (with which the ships on the North American station were afterwards very liberally supplied) in all probability many lives would have been preserved on board the English ships; and they would have arrived on the Coast in a fit condition for active service; which, in fact, was not the case.

If we take a view of the orders and regulations relative to the preservation of the health of seamen, and the recovery of the sick and convalescents in the French marine, we shall have farther reason to think that our improvements in these matters have hardly kept pace with those of our neighbours. Among a number of useful regulations and arrangements for those important purposes, it is ordered, that not only a proper quantity of rice and malt be embarked for the use of the sick; but likewise a sufficient quantity of conserve of sorrel for the different soups, and panadoes; which are found to agree better with the sick at sea, than animal food.

A proper quantity of carrots, onions, and ground mustard, are likewise ordered to be taken on board

fication, and nutrition, which may be greatly increased by a morbid state of the bile.—This consideration leads me to consider the general uses of the bile, and how far that

for the use of the ship's companies; and a certain number of fowls for the convalescents.

As stores for the sick (besides what are usually sent in the medicine chests) it is ordered, that vinegar, spirits, tea, sugar, and a quantity of the rob of lemons, be embarked; with this last they prepare an excellent antiscorbutic punch, &c.

The sick and convalescents are supplied with *wine, and good fermented bread*; and it is ordered that what bread and wine may remain of the allowance of the sick, shall be preserved: the bread to be used for the purpose of making cataplasms; and that the wine may be used for fomentations, and other medicinal uses, when necessary.

Being convinced that furnishing their people with good and wholesome diet is one of the most efficacious means of preserving their health, the commanders, &c. are strictly charged to watch with the greatest care, that the provisions, the wine, and the water, be preserved in such a manner as not to suffer the least possible prejudice during the longest voyage; and that water must never be distributed for drink, till after it has been *three times filtrated through cloths*.

There

that fluid may be particularly affected and concerned in the Scurvy.

Of all the different secretions, there is, perhaps, none of more general use in the animal œconomy, nor more necessary to health, than the bile *well-conditioned*; this observation will appear reasonable, if we consider the ample provision made by nature for its secretions; the quantity secreted; its obvious uses in perfecting digestion, and promoting the assimilation of the
chyle

There are likewise orders for sweeping, brushing, and mopping, the decks; keeping the berths clean, &c.; and it is also directed that the sick berths, the hold, and betwixt decks, be perfumed (or fumigated) twice a day; or even oftener; particularly, when the sick people take purgatives.

The greatest vigilance and attention in the observance and execution of all the orders and regulations are strongly recommended to the commanders of all his Majesty's ships and vessels; and that they encourage exercise, activity, and cheerfulness, among those committed to their care; and employ every measure, that can contribute to the health and preservation of their crews.

“*Fas est ab Hoste doceri* ;”—Hence perhaps some of those regulations may not be unworthy of imitation; it is possible they may be improved upon—We ought

chyle with the other juices ; and the many disorders attending the degeneracy, or obstruction of this saponaceous, resolvent, menstruum.

If I may be allowed to suppose the crasis of the bile impaired ; I may infer that it must be incapable of answering the above-mentioned salutary uses ; in consequence of which, that relaxed state of the solids, evident in the Scurvy, is produced ; the blood degenerates from the healthy standard ; all the secretions become imperfect, particularly the more refined, as that of the cerebrum, &c. ; and, as in this case the brain, and its appendages, cannot properly perform

to endeavour to excel in every point, which relates to the naval department ; and we certainly do in most ; but it is to be lamented that any practicable means for the prevention of sickness, or for the restoration of the health of seamen, should be neglected. I have no doubt but the present Government, who certainly have the prosperity of these dominions at heart, would readily adopt any measures likely to prove beneficial, if properly explained, and their advantages made evident. Wherefore it is the duty of every well-wisher to the State, to contribute to the utmost of his power to the perfection of the navy ; as on that chiefly depend the safety, wealth, and glory of this country.

their functions, the organs of digestion, so plentifully (and no doubt usefully) stocked with nerves, will become debilitated; and the new supplies of chyle will be deprived of a due quantity of that nervous influence, probably indispensably necessary to the formation of a truly nutritious fluid.

The depraved state of the bile, here supposed, would appear to be one cause of that costiveness, to which many scorbutics are subject; as the grosser parts of the bile in a natural state probably promote the evacuation of the excrements by gently vellicating the internal surface of the intestines, and thereby exciting their peristaltic motion.— So in scorbutics; the bile, having lost great part of its peculiar pungency, acts no longer as a stimulus to the intestines; whence their motion becomes languid and feeble; they protrude the excrementitious mass more slowly; and the excrements, being longer detained than is natural, must be productive of much mischief, and greatly contribute to putrescency.

Query.—Whether the bile, which in a state of health, is intimately mixed with the chyle, and with it passes the lacteals, may

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not

not from its saponaceous quality, act as a medium, and dispose the different particles of which the blood is composed to become intermiscible, to be more intimately blended, and to form a more uniform homogeneous fluid?—Should this be allowed, I must conclude that the bile, in a state of depravity here supposed, is no longer in a condition to maintain that degree of union and cohesion necessary to preserve the blood from dissolution, and putrefaction; especially when accompanied with an unelastic state of the solids: and hence we may account for the extravasations, hæmorrhages, putrid gums, and mortified viscera, so common in scorbutics.

The above changes usually take place without fever; but, should a feverish access now supervene, the salts and oils not being duly incorporated, will be heated and exalted, and will greatly contribute to acrimony and dissolution. *

* When it happens that fever (which in such situations and in such air is always of the putrid malignant kind) occurs; and men are attacked with this dreadful disease while their juices are in the dissolved state above described, we may well exclaim,—“*Heu! quantas Acies stragemque ciebit!*”

I shall

I shall not, at present, take notice of the natural evacuations, or the consequences (with regard to Scurvy) of their profuseness, obstruction, or suppression; but shall proceed to offer such means as appear to me most effectual and practicable in preventing this destructive malady.

S E C T. V.

Prevention of SCURVY at Sea.

THE means of preventing the Scurvy at sea must be as various, as the circumstances, which pre-dispose to it, or the causes, which excite it. However prevention is much more in our power than the cure. This last is in general extremely difficult at sea. Indeed how can it be otherwise; the causes still existing, and the means of cure commonly inadequate?

The Scurvy may be deemed rather a gradual subversion of the constitution, than a disease. Whence I would infer that its prevention at sea may, in a great measure, consist in correcting the humidity of the air betwixt decks; in better regulating the time of seamen's labour and rest; and in adopting a more wholesome diet.

Much has been said on the subject of purifying the air betwixt decks; therefore I shall

shall be as concise on this subject, as possible.

As scuttles in proper places betwixt decks are of the greatest utility, they ought to be made, wherever they can with convenience and safety.—Scuttles* ought to be made as near as possible to the upper deck in frigates,
or

* Scuttles in the lower deck ports of line of battle ships were first proposed in March 1777 by my late brother, William Thomson, who was then Surgeon of the Royal Oak. In a letter he received from the late Sir Charles Whitworth, (whose truly benevolent disposition prompted him to search for, and to promote to the utmost of his power, every improvement that tended to the welfare of mankind; and with whom he had for some time corresponded on subjects likely to prove of general utility) Sir Charles requested that he would communicate to him any alteration or improvement, which might appear to him likely to contribute to the preservation of the health of the seamen on board his Majesty's ships; which information he proposed to lay before Lord Sandwich, at that time First Lord of the Admiralty. In answer to Sir Charles he acquainted him, that a very material and useful improvement might be made in line of battle ships; which was to have scuttles made in the lower deck ports; that these would, at all times be useful, by admitting fresh air betwixt decks; but more especially in winter cruizes; when the

or other ships, (when not made in the ports,) to prevent any inconvenience to those, who lie nearest them; and as vapours and foul air ascend, they will be more likely to escape, when the outlets are high. The scuttles, being opened occasionally, will give a constant flow of fresh air; the foul noxious air will be expelled, and the bad effects of putrid unwholesome exhalations will, in some degree, be obviated.

The greatest attention ought to be paid not only to the cleanliness, but to the dryness of the ship's decks, and to avoiding as much as possible, washing the lower decks with sea water; particularly in cold or moist weather.

ports cannot be opened sometimes, perhaps, for a week or two together. Some time after this he received another letter from Sir Charles, wherein he informed him, that his proposal relative to the scuttles was well received, and was under consideration. Soon afterwards scuttles were made in the lower deck ports of one of the ships in the Channel fleet. However, in the course of a few months, Lord Mulgrave, sensible of their usefulness, procured an order to have them made in every lower deck port of the *Courageux*, the ship his Lordship then commanded.—Scuttles are now very general in the navy.

A prac-

A practice has long obtained in the navy of frequently admitting sea water into the ship, and pumping it out again ; in order to cleanse and purify the lower parts of the hold, &c. But this, in my humble opinion, ought to be discontinued, as much as possible ; as it must necessarily occasion an increased degree of moisture in the hold ; consequently there must be an increased evaporation, which will occasion an increased humidity betwixt decks, &c. one of the principal causes of disease.

It would appear no difficult matter to render this practice entirely unnecessary ; and as the noxious effects of humidity in ships are universally allowed by those, who take the trouble to think on the subject, the importance of preventing it, as much as possible, must be evident. Perhaps the ballast being carefully sifted, cleansed, and dried, before it is taken on board ; the hold being likewise clean and dry, and the air changed frequently in the manner hereafter recommended, may be the principal circumstances necessary to be attended to for this purpose.

The ballast ought to consist of pretty large pebbles, or what is called shingle ballast, and

as free from small gravel, sand, or earth, as possible; and whenever the ship is docked, or hove down, the hold and ballast ought to be well cleansed and dried.

Fire is the most powerful preventive and destroyer of humidity and contagion. Its mode of action seems to be by the evaporation of humidity, and the correction and dissipation of infectious effluvia; and I am convinced, that if charcoal fires were properly used betwixt decks, and on the orlop deck, occasionally; they would be found of the greatest utility, not only in destroying contagion, where it does exist; but by correcting the humidity of the atmosphere, and obviating the bad effects of noxious vapours from the bilge-water, &c. I should therefore recommend, that whenever the lower, or middle decks of a ship are washed, (which ought to be done every second or third day when the weather will permit,) and when they are made as dry as swabs can make them; that four iron pots with charcoal fires in them should be placed on each side of the deck, with a proper person to attend each pot, which he is to move from place to place, so that the space allotted to each pot may

may be properly dried and warmed. These pots should have iron covers pierced with holes, which would effectually prevent any accident; or something like braziers might be contrived, which might perhaps be more conveniently used for this purpose. Some common brimstone, or a spoonful or two of the flowers of sulphur, or a paste made of sulphur, nitre and vinegar, may be thrown on these fires; which will not only assist in correcting and altering the disposition of the air, but will oblige the seamen to quit those decks, until they are perfectly dry.

While sulphur is used in this manner, the hammocks should remain hanging in their places; and they ought not to be lashed up, but should be opened as much as possible, that any humidity, they may have acquired, may be evaporated: and, as the effluvia from charcoal and brimstone most effectually destroy all kinds of vermin, they may be useful in that respect.

Frequent fumigations with tar, aromatic woods, tobacco, junk, &c. &c. are of great utility, and ought to be practised.

Every person who has been at sea must be sensible how very useful and agreeable
wind-

wind-fails are in summer, and in hot climates. But the wind-fails in common use are by no means well contrived to answer the intentions of them. Angular, horizontal, wind-fails are greatly preferable to those, which are hoisted perpendicularly.

To form an angular wind-fail, let a frame of wood of sufficient strength be made, and fitted to a gun-port opposite to a hatchway, and to this frame the mouth of the wind-fail is to be fixed. The mouth of the fail must be square, and made to fit the frame, which is to be as large as the port. The other part of the fail may be circular, and about 18 or 20 inches diameter.

The wind-fail, thus fixed to the port, is to come horizontally from the port to the center of the hatchway opposite; and here the fail should form a right-angle, and drop down perpendicularly to whatever depth may be judged necessary.

The fail is to be kept distended by four wooden hoops in the horizontal part, and as many in the perpendicular; and a strong hoop should be fixed, where the angle is formed.

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In ships of three decks, the wind-fail should be fixed on the middle gun-deck; in ships of two decks, the lower deck will be most proper, when the weather will admit of the ports being kept open; but, when that cannot be done, it must be placed on the upper deck.

The gun belonging to the port appropriated to the wind-fail is to be secured fore and aft between the two next guns; or in any convenient place. The fail is always to be set to windward; therefore, when the ship is tacked, the fail must be shifted, which may be done by one man in a minute.

By means of two of these fails, and keeping the ventilators constantly worked, the air in a ship may always be kept sweet and cool.

It is well known that many of the stores in the care of the boatswain, and carpenter, become rotten and useless for want of fresh air being admitted into their store-rooms. Small angular wind-fails might be easily contrived, and fixed so, as to convey an almost constant stream of air into these store-rooms.

I have

I have thought of several methods of extracting foul air out of ships holds, wells, store-rooms, &c.; and of forcing fresh air into those places; but never could gain the desideratum. What I think would answer the purpose better than any thing which has yet been invented, is a kind of forcing air-pump, (but very different from the common air-pump) made by that ingenious mechanic, Mr. Merlin of Prince's Street, Hanover Square; which he calls the Hygean Pump; and which will effectually answer those purposes after a little improvement; which may easily be made. This machine may prove of the greatest utility on board of ships; as, by means of it, the foul, noxious, humid, air may be drawn out of any of the store-rooms, hold, well, &c.; and fresh, wholesome, air thrown forcibly in, in any quantity which may be thought necessary. All this may be done in a few minutes; and what enhances the value of the machine is, that when made in the manner proper for sea use, it will not be expensive, nor liable to want repair. It will not take up more room than a common chair, and
may

may occasionally be taken to pieces, and put into a case.

When a ship is pretty well manned, the men ought certainly to be put to three watches. This, I am convinced, would contribute greatly to the preservation of their health; and in general, at sea, when there is no particular duty to be done, one-third of the crew are equal to the common business of the ship. If any thing should occur that may require more strength, by calling up another watch, they will be sufficiently strong for almost every purpose.*

* I have several times seen the ship's company at three watches, and it always had the effect of making them appear more cheerful and happy.

In the year 1778, when the *Victory* was going to sea, my brother, who was then surgeon of her, proposed to the captain, that, as the ship was pretty well manned, it would be of great use in preserving the health of the men, if they were put to three watches. The proposal was immediately put into execution, was found to answer so well, and was so much approved of, that in the general instructions for regulating the fleet, it was recommended to all the Captains to adopt it. But such is the attachment to established regulations, that many persevered in the old custom of watch and watch.

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By this regulation each man would have at least seven hours sleep every night; wherefore it could not be thought a hardship to keep all hands on deck, from eight o'clock in the morning till evening, either for the duty of the ship, or for exercising and training them at their respective stations.

When it is thought that the ship's company is not sufficiently strong to admit of their being divided into three watches, they must necessarily be kept at watch and watch; and here I think great improvement might be made; I mean in the mode of dividing these watches, and that the men might be allowed to sleep seven or eight hours at a time, each alternate night, by which means they would be less liable to have perspiration checked, and they would be more refreshed, than in the present manner of dividing the night duty.

Suppose the starboard watch goes to bed at four o'clock in the afternoon, and turns out at ten o'clock at night; the larboard watch turns in at ten at night and lies till six o'clock in the morning. In this way, I should imagine the men will be better enabled to bear the fatigue of the day, even should
they

they have no more sleep in this, than in the present division of the watches. The above method is more agreeable to nature, and the custom amongst farmers, mechanics, &c. When the duty will admit of it, the starboard watch may have a two-hours nap from six to eight in the morning, or the dog-watches may be between four and eight in the morning, instead of the evening; the remainder of the day may be divided into labour, or rest; or, when all hands are necessary, they will be more able to exert themselves in whatever their duty requires. However, these hints I submit to the consideration of the officers, whose duty it is to regulate these matters, and who of course must be the best judges.

The excellent regulations and orders issued by that great and judicious officer Lord Howe to the captains, &c. under his command during the late war, for the preservation of cleanliness, and for preventing the men making improper uses of their cloaths, &c. by dividing the ship's company into a certain number of divisions, and appointing a lieutenant and one or more midshipmen to each division, who were to be responsible for the cleanliness

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ness and good order of the men assigned to their care; cannot be too highly applauded.

The necessity of preserving the water on board, as pure as possible, is evident; and several means have been proposed for that purpose. Dr. Alston, near forty years ago, recommended quick-lime, in the proportion of about one pound to a hoghead of water, as the best and most certain means of preventing the corruption of water, or of insects generating in it. Quick-lime, used in this manner, seems to act by preventing fermentation in the water, and by correcting that putrescent matter, which is frequently observed on the surface of water, and on the sides of casks; and in which small insects are generated.

The putrid disagreeable water, which is often used at sea, has been supposed a principal cause of diseases. But that certainly is not the case; as there are innumerable instances of ships crews using water highly offensive, both in taste and smell, for a considerable time, and yet they have been healthy.

Elixir of vitriol, alum, cream of tartar, tamarinds, &c. have been used with advantage

tage in lessening the putrid offensive taste and smell of water, and in rendering it less noxious and disagreeable.

Filtration is likewise of great utility in purifying water by means of a dripping-stone, gravel, &c.

Osbridge's machine for dividing the water in the air is an excellent invention, and has for many years been used in the navy with great advantage.

The apparatus for distilling fresh water from salt has been so frequently found useful in cases of distress, that no ship ought to sail without one.

Mr. Henry's method of sweetening and purifying putrid water by means of quick-lime, &c. and of impregnating large quantities of water at a time with fixed air, is very ingenious, and may answer very well in hospitals; but, I fear, it would be found too tedious, and too nice an operation to be practised on board men of war.*

It

* See "An Account of a Method of preserving Water at Sea from Putrefaction, and of restoring to the Water its original Pleasantness and Purity, by a cheap and easy Process.—To which is added, a Mode

It is a good practice, and ought to be a general rule, for ships not only to complete their proportion of water as often as they have an opportunity; but likewise to start all the water, which has been on board for any time, and to fill the casks with fresh water, as often as it is practicable.

All the above modes of rendering and preserving water pure and wholesome are worthy of attention, and ought to be universally known; but if the plan, which I have proposed for supplying the ships companies with good wholesome beer, be adopted; the purity of the water will be of less consequence, as the process of brewing will sufficiently correct it.

The calamities of war are numerous; and, were the whole of them divided into classes, or viewed comparatively, the mortality occasioned by disease, would probably exceed all the others united. Hence we see the necessity of the strictest attention to the

of Impregnating Water in large quantities with Fixed Air for Medicinal Uses on Board Ships, and in Hospitals.—By Thomas Henry, F. R. S. &c.—8vo.. Warrington.”

means

means of preserving the health and lives of our fellow-subjects, who are thus engaged in the defence of our country, and of every thing which is dear to us. As this is evident in every point of view, no argument is necessary to demonstrate it, or to point out the criminality of inattention and negligence in a matter of such importance.

I shall take the liberty to mention another circumstance, which I think of great consequence to the health and comfort of seamen; and that is, the treatment they meet with from their officers, and those, who have command over them.

I have the highest respect for the officers of the British navy, and am convinced they are possessed of as much benevolence, good humour, and humanity, as any class of men in the world; but it sometimes happens that young officers from passion or caprice are too rigid and severe in their mode of carrying on duty; and to such I beg leave to remark, that officers, who really have the good of the service at heart, will always treat those under their command with as much kindness and indulgence, as the nature of their duty will admit of.

Men are always sensible of this, and are grateful for such treatment—it keeps them cheerful, and in good humour; they are more active in their duty, and more attached to the service; their good treatment and happiness being known to others would be a great inducement to them to enter into the service. Vexation and despondency have, I fear, been too often the consequences of severe treatment; and they are known to be frequent causes of diseases. But I do not mean by these observations that officers should relax in the least in enforcing strict regularity and discipline; these are absolutely necessary, perhaps more so with seamen than with any class of people. All I mean to recommend is, as much indulgence and civility, as are consistent with the service; and the avoiding any appearance of wanton severity.

When officers conduct themselves in a humane, yet steady and manly manner, enforcing strict discipline without unnecessary punishment, they are certain of securing the respect and esteem of those, they command. Such conduct will create confidence in the minds of the men, will reconcile

cile them to their situation, and will increase their contentment and happiness, which will contribute greatly in warding off diseases. Seeing then that a contented mind is of great importance in preserving health, it should be inculcated in the breast of every young officer, as an unalterable principle, always to endeavour to reconcile strict discipline with humanity and good treatment.

The hardships and inconveniences to which seamen are frequently exposed, even in time of peace, must in some degree injure their constitutions; and when to these we add the intemperance and irregularities of which they are frequently guilty, we need not be at a loss to account for seamen being, in general, more short-lived than any other class of men. The unavoidable bustle, hurry, and hard duty, in time of war, greatly increase their hardships; and their lives are not so comfortable, in general, at this time, as in peace; which is partly owing to a larger complement of men being on board, who are obliged to lay in the same space; some of these perhaps, discontented, impressed, men; and many others, landsmen, or men unaccustomed to a sea life, conse-

quently less capable of undergoing that kind of hardship; prone to low spirits, slothfulness and indolence; therefore more liable to disease.

I have just mentioned these circumstances to shew the necessity of officers endeavouring to the utmost of their power to lessen the inconveniences and difficulties to which their men are unavoidably exposed; and when sick, to alleviate their sufferings in some degree, by rendering their situation as comfortable as they possibly can.

D I E T.

THE supposed impossibility of substituting any kind of provisions, instead of biscuit, salt beef, and pork, because of the impracticability of preserving them for any length of time, is perhaps the principal reason why no great improvements have lately been made

made relative to these important articles of diet. The above supposition may be just with respect to the two latter articles, but certainly not to the former. I shall elsewhere take occasion to propose a method of furnishing the seamen constantly with good wholesome bread on board his Majesty's ships—or, at least, sufficient for the sick and convalescents, who are, no doubt, most subject to the Scurvy; and who have most occasion for a light nourishing diet.

Great improvement might be made in the manner of preserving beef and pork—foreign salt, as that of St. Ubes ought to be preferred; and there are several aromatic astringent vegetable substances which by corrugating the fibres of the meat would assist greatly in preserving it without destroying its nourishing quality.

The diseases most prevalent among seamen are Fevers, Fluxes, and the Scurvy; and these are chiefly occasioned by the coarse, indigestible, food they live on, and the warm, humid air, they breathe in betwixt decks; this last cause of disease, I have already noticed, and shall now endeavour to point out some useful regulations that may be made with respect to the diet of

seamen in the navy, particularly the sick and convalescent.

In the first place, brown sugar or molasses should be issued to the ship's company instead of butter and cheese.* Instead of peas and oatmeal, wheat might be used to great advantage, as affording a more nutritive and less viscous chyle. Wheat may be boiled in water till all the husks burst, and till almost all the water is evaporated; which is about three hours; then a sufficient quantity of sugar or molasses may be added to make it grateful. This, or rice, I am convinced, would be greatly preferable to peas, or oatmeal.

The mode and time of using the different species of provisions might perhaps with some advantage be arranged in the following

* The substitution of brown sugar or molasses instead of butter and cheese was proposed to the late Lord Keppel by my brother in 1778, when he was Surgeon of the Victory.

Brown sugar is preferable to molasses, as the men relish it better, and can keep it in their berths more conveniently. It is very difficult to keep molasses in casks without losing some part of them, so that large earthen jars properly covered, and secured against injuries, would probably answer better.

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manner. Let peas be boiled only on Sundays and Thursdays, and served with pork as usual. Let wheat, or rice, be allowed instead of peas on Mondays, Wednesdays, and Fridays. Instead of butter and cheese let each man have six or eight ounces of brown sugar, or an adequate quantity of molasses, every banyan day to sweeten his wheat, rice, or burgow. Oatmeal, flour, suet, currants, beef, pork, &c. to be served as usual.

The kind of diet just described, and the distribution of it, would in my humble opinion be found much more wholesome, than that which has hitherto been used in the navy ; and the substitutes, which have been proposed for butter and cheese, would not only be more wholesome and agreeable to the men, but would be much less expensive to Government, as will appear evident, when it is considered what a large proportion of these last articles are annually condemned as unfit for men to eat.

It is observable that the Scurvy seldom or never appears at sea, whilst the men have a plentiful use of small beer ; a clear proof of the salubrity of fermented liquors, their antiseptic quality, their utility and power in
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promoting digestion, the comminution and assimilation of the food, &c. The impossibility of ships being constantly supplied with beer, has justly been deemed an unfortunate circumstance. In the navy, on stations where small beer can be supplied, the men are allowed seven pints a day; or as much as they chuse to drink. Now, if these seven pints (the king's allowance) were reduced to four pints, the reduction allowed to improve the quality of the beer, and the quantity of hops proportioned to its strength; this beer to be issued in the same manner as wine or spirits are abroad; the advantages that would attend this alteration, would I am persuaded, soon become apparent. Beer of the quality here proposed would prove a much better antiscorbutic than a larger quantity of the weak small beer, with which ships of war are generally supplied; with this favourable circumstance; that, as they would stow a much greater proportionate quantity, the men would be longer supplied with it.

But as it is impossible to carry a sufficient quantity of beer for the use of a ship's company in a long cruize or voyage, materials
for

for preparing a wholesome antiscorbutic drink ought to be provided. So much has been said, and very properly in favour of malt and its essence; essence of spruce, &c.; that I shall not take notice of them at present; but instead of these, or where they cannot be procured, I would recommend treacle-beer, or what may be called hop-beer, to be used. For this purpose a quantity of hops and molasses should be taken on board of ships, which are likely to be long without refreshments; and from these a liquor not only extremely salutary, but pleasant, may be prepared at sea with very little trouble or expence, by boiling the hops in water slowly for an hour, in the proportion of 10 pounds to 288 gallons, or eight barrels of water; and adding one hundred weight of molasses, when the decoction is sufficiently cool. They should be well stirred together, then tunned into casks, a little yeast added, and left to ferment. The management afterwards is the same as that of spruce beer.

The quality of the beer here proposed is equal to that of the small beer in use in the navy; but the proportion, I have used in
making

making hop-beer, was one ounce and half of hops and one pint of molasses to each gallon of water ; and the beer prepared from this was excellent.

A hundred weight of molasses is equal in strength to eight bushels of malt ; and with ten pounds of hops or the extract (if properly prepared) from the same quantity, will make three barrels of beer equal in strength to porter.

As I have mentioned hops, and have a very high opinion of their antiscorbutic virtues ; I hope it will not appear improper, if we here take a view of their general qualities, &c. The hop plant is perennial,—grows wild in hedges, and in many uncultivated places in this country, as well as in most parts of Europe. The forests in America are plentifully stored with them, no doubt for wise and useful purposes.

The hop plant in common use, of which I mean to treat, is cultivated in plantations, and is so well known that it is unnecessary to describe it. Suffice it then to say, that the scaly heads of the plant, or the parts which are commonly used, have an agreeable flavour, and are possessed of an aromatic,
subtile,

subtile, austere, discutient, bitter; not ungrateful to the palate. Being replete with aromatic, subtile, active qualities, they stimulate the solids; from their austerity they act as a powerful tonic, and from their discutient quality they prove resolvent and diuretic.

A combination of these properties heightened by fermentation fits them for attenuating viscid chyle; correcting the morbid quality of the bile in scorbutics; preventing or removing obstructions in the glands or capillaries; bracing and invigorating the solids, and promoting the regular secretions and evacuations. Hence would hops appear justly entitled to a preference, as an antiscorbutic, to almost any substance we are acquainted with; and what enhances this consideration is, that they are very convenient for exportation; easily preserved in all climates; and so little liable to damage, that it is only necessary to keep them dry.

Another favourable circumstance is, that an extract is easily prepared from hops, retaining almost all their qualities; which will keep for years, and will require but little room for stowage; therefore the extract
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may be thought most convenient for use at sea.

Hops give out their virtue to spirit by maceration without heat, and to water by warm infusion—but in making hop-beer I prefer boiling the hops slowly for some time, with a cover made to fit the copper exactly, but so as to pass into the copper, to lay on the hops, and to press them down into the water. The usual lid or cover should likewise be kept almost close, so that the evaporation of the volatile parts may be diminished as much as possible, without danger of bursting the copper. By these means the water will act more powerfully in extracting the virtues of the hops, the liquor will be more fully impregnated with their salutary qualities; and, as hops contain a very considerable proportion of essential oil, (a great part of which is lost in the common mode of brewing) I think, by boiling them in the manner just mentioned, a great part of the oil may be retained, and the decoction will be more saturated with it, than in the common way.

The copper heads lately adopted by many of the brewers answer this purpose extremely

remely well, as they prevent the oil, &c. flying off; and when these can be used, they are certainly preferable to any other method. There can be no objection to their use in the navy.

The essential oil of hops may be obtained with more ease and certainty by compression than by distillation; but it has been found by experiment, that, for the preservation of beer, the austere, as well as the mild and unctuous parts of the hops are absolutely necessary; and that beer cannot have the full benefit of the hops in any other way than by coction. By the manner of boiling hops as mentioned above, I imagine that the spirituous and volatile parts of them are so entangled and blended with their oil, and mucilage, that they are in a great measure prevented escaping.

I shall just mention some other properties which hops, and the different parts of the plant are said to possess; but can see no reason for a suspicion of their unwholesomeness.

A pillow, or bag stuffed with hops, and laid under the head, has been said to induce sleep in fevers, attended with delirium:—
or, when hung up in a bed, they have been

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supposed to procure rest and compofure in fome cafes, even after opium has failed.

Hop-tops, while tender in the fpring, are eaten like afparagus, and are diuretic and aperient.—The heads and tendrils (while young) have been ufed as purifiers of the blood in cutaneous difeafes.

A decoction of the roots of the hop-plant has been efteemed an excellent remedy for the Lues Venerea.—It has been long ufed by the Spaniards; who in that cafe drink half a pint of it warm, in bed, every morning.

There is an agreeable odorous principle in hops, which increafes the vinous fermentation in liquors; and when they are boiled, or infufed in water, they evidently increafe its fpirituoſity.

Decoctions, fyrups, apozems, and juleps, prepared with hops have been ufed in Peftilential Fevers; likewise againſt Hypochondriacal and Hyſterical Affections; and as emmenagogues.

Should hops, or their extract, be thought too expensive for general ufe; or if at any time they cannot be procured, the roots of the acorus calamus, or calamus aromaticus, would

would make an excellent substitute.—These roots may be procured at a very trifling expence; and when properly dried, may be preserved a long time; they possess a warm, aromatic, bitter, quality, from which they have been esteemed, carminative, stomachic and deobstruent. The fresh root candied is said to be employed in Constantinople as a preservative against epidemic diseases.

I have used the dried roots sliced in the proportion of one oz. to a gallon, instead of hops, in brewing the treacle beer; and found them answer very well. They give the beer a very agreeable bitterish taste; but they do not answer so well as hops when the beer is intended to be kept any length of time.

A small proportion of gentian root, or ginger, might occasionally be added to drinks of this kind; the advantages of which will appear evident to every medical man.

By the above process of brewing with very little expence, or trouble, a liquor may be prepared of the greatest efficacy in the Scurvy; I will venture to say not inferior to malt, or spruce, beer. A ship's company

may be supplied with this, when neither malt nor spruce beer can be procured ; or it may be reserved for the scorbutics, or convalescents, only.

As one copper is sufficient to boil wheat, rice, or oatmeal, enough on banyan days, I would propose that the other should be employed in brewing on those days from the time the ship leaves the port ; and, as the small beer casks become empty, let the hop-beer be tunned into the casks ; and this to be continued until as much is prepared, as may be thought sufficient.—When the hop-beer is to be used, let them begin with the oldest first, as all the beer will hereby have sufficient time to improve by keeping.

Those inclined to the Scurvy may bathe, and rub their legs, thighs, &c. with the hops, after they are boiled ; but for this purpose they ought not to be too much pressed in straining, and should be used warm.

By the above method of brewing a sufficient quantity of yeast may be procured for baking bread for the ship's company ; or for the sick and convalescent at least : the advantages of which are too obvious to require mentioning.

Yeast

Yeast may be preserved in the following manner :

Spread a thin layer of yeast on the bottom of a clean tub, or a small cask with one head taken out ; turn the bottom upwards, till the yeast dries ; then lay another layer, turn the tub in the same manner, and repeat it, till the tub is full of dried yeast.—This will keep good a considerable time.

Another method is, by spreading yeast thin on clean boards, exposing it to a moderate degree of heat till its humidity is so far evaporated, that it has a granulated appearance, and feels dry to the touch ; it is then to be put into small bottles, or phials, which are to be well corked and sealed.

When yeast is wanted for brewing or baking, a pound of molasses may be mixed with a gallon of hot water ; and, when it has cooled so as to be about blood warm, or between the 90th and 100th, degree of Fahrenheit's Thermometer, a little of this preserved yeast is to be mixed with it.—Let them be stirred together and kept in a moderate degree of warmth, and a brisk fermentation will ensue, which will produce good yeast.

Honey or sugar may be used instead of molasses; and if a little porter, or stale beer are added, the fermentation will begin sooner.

The difficulty and inconvenience of making bread at sea may in a great measure be removed by the following method.—Let a baker be entered on board, and exempted from all other duty; furnish him with a trough for raising and kneading the dough, of proper dimensions according to the rate of the ship; and let him have, flour, yeast, &c. in a convenient place for the business, and he will require little or no assistance,

It would be no difficult matter to contrive an oven to bake bread on board, and such has been proposed; but as the ovens in Brodie's fire-places, in common use in the navy at present, are sufficiently large to bake bread for the sick and convalescents without any additional expence of fuel, they appear preferable to any thing of the kind, which has hitherto been invented:—and I should suppose that with these ovens, and a little additional fuel to bake in the night, bread enough may be prepared to supply the whole

whole ship's company; which would be of the greatest advantage. For if the men are supplied with good fermented bread and beer, such as is described above, they will have little reason to dread the Scurvy.

One advantage that will arise from this plan of baking at sea, is, that it will not be necessary to carry much biscuit to sea, which will allow room for a larger quantity of flour, as well as hops, essence of spruce, &c. &c.

The quantity of flour sufficient to make bread for three months will not require more room than one month's biscuit.—A cask containing five bushels, or 280 pounds weight of flour, will make 400 pounds weight of fermented bread, and will be sufficient for 400 men one day.—400 pounds weight of biscuit will take up as much room, as three or four casks of flour.

Experience has convinced me, that the utmost attention and assiduity of the officers, and others concerned, are insufficient to prevent Scurvy on board of ships; the length of time at sea without fresh provisions, and the moist state of the weather, concurring with other circumstances to produce it.—There are some constitutions in

which there is a natural tendency to the Scorbutic diathesis; and in which it is almost impossible to prevent the Scurvy in a long voyage, by diet alone, without fruits in their recent state, &c. It is therefore necessary sometimes to have recourse to such remedies, and other means, as have been found most efficacious in preventing the disease.—When there is reason to apprehend from the length of the voyage, state of the weather, &c. that the men may be inclined to a scorbutic indisposition; the whole crew ought to have their gums, thighs, legs, &c. examined every fourth or fifth day by the surgeon, or his mates; and those, who have the least symptom of Scurvy, ought to be immediately attended to.

All the circumstances mentioned as conducive in producing the disease should be avoided; particularly salted meat.—A vegetable diet should be used as much as possible, and the different means for the prevention and cure of the Scurvy had recourse to with the greatest assiduity. Their drinks should be acidulated with the essences, robs, or conserves of acid fruits; but where these are not to be procured vinegar, or cream of tartar,

tar, ought to be used.—Any kind of fermented liquors that are on board, as beer, cyder, or wine, ought to be liberally allowed; mustard, onions, and vinegar should be used freely with their victuals; and at bed time, every night, they should take a pint or more of some warm antiscorbutic drink, in which some of the vegetable acids are mixed, in order to promote perspiration.

Oranges, lemons, and limes, are particularly useful in preventing the Scurvy, and their juices may be kept for a considerable time, if carefully expressed, strained, bottled, and a small quantity of spirits mixed with them.

The juice of limes and lemons pure or diluted, according to circumstances, has been found to be an excellent topical application in scorbutic ulcers.

Wines, malt liquors, especially porter, spruce-beer, hop-beer, cyder,* &c. are particularly

* Cyder is an excellent antiscorbutic; a proof of which we had on board the Renown frigate in 1762; when, after a long cruise in the Channel; immediately afterwards a voyage to Jamaica; whence, (after stopping one day, to get some water, &c. on board)

ticularly useful in obviating Scurvy; and one would suppose from considering the symptoms and phenomena of the disease, particularly the debility and lassitude, which scorbutics always complain of, that the disease must depend on a relaxation of the fibres, a disunion, and degeneracy, of the fluids; and that the Peruvian bark, that *magnum Dei donum*, would be almost a specific.

I have, in several cases given the bark a very fair trial in the Scurvy, but never could observe that it was of much service at sea, where its use could not be accompanied with fresh vegetables, fermented drinks, or acid fruits; but either with, or after the

we sailed on a cruize off Hispagniola, and were seven weeks more at sea. Several of our people became highly scorbutic, which was not to be wondered at, as for upwards of four months they had not had any refreshments, except during the few days we were at Portsmouth, and our very short stay at Port Royal. Captain Maitland happened to have two barrels of very good cyder on board; which, towards the latter part of our cruize, he ordered to be distributed among the scorbutics, evidently with the most happy effects.

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use of these, in order to cure particular symptoms, as foul ulcers, &c. I have found bark of the greatest service.

During the convalescent state, after fevers, &c. the bark is certainly of great use in warding off Scurvy; more especially if joined with the fossil acids; and these, with chalybeates, and indeed all medicines, that have a tonic and astringent power, seem well adapted not only to guard the convalescent, but to enable relaxed constitutions to resist disease; and, when lemons or oranges can be procured, their juices joined with the bark will render it more efficacious in preventing or curing Scurvy.

When neither of the acid fruits can be procured, vinegar is a good substitute.

The infusion of malt, or wort, has been found useful in preventing Scurvy; and, when given in considerable quantity, it certainly has a good effect as a preventive; as I have several times experienced. But, after the scorbutic symptoms have once appeared, wort does not seem adequate to the cure; although I think I have seen the progress of the Scurvy checked, and remain for some time stationary at sea, from the free
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use of wort.—Ships going on long voyages should therefore be supplied with malt, and every possible precaution should be taken to preserve it good ; for malt loses in some degree its saccharine taste, and nourishing principle, after having been kept some time at sea.

Was it not too expensive, the most effectual means of preventing Scurvy would be to supply ships with porter.—Was each man allowed only a pint of porter a day ; and were the other means for the preservation of health (which have been, and will be, mentioned hereafter) properly attended to, I venture to say that the Scurvy would never appear ; except perhaps in a debilitated, worn out, constitution ;—or where there is a very great predisposition to the scorbutic diathesis.

I had an opportunity of observing the effects of porter, as an antiscorbutic, on board the Richmond frigate, in the late war ; and, as the scenes of distress on board of that ship occasioned by Scurvy during a cruise on the coast of America, were more shocking than any I ever heard of in a ship of that class,

class, I shall give a concise account of them.

The Richmond sailed from Spithead the 9th of Sept. 1776, with two very valuable storeships under convoy for Quebec.—Her crew was composed of more than two-thirds landsmen, (exclusive of the marines) and many of these were poor wretches, who had just before been brought in the tenders from Ireland, &c.—After we left the Channel, we had a series of wet, tempestuous, weather; insomuch that, notwithstanding the utmost attention of the officers, we lost company of both the ships; one of which (as we were afterwards informed) foundered, soon after she parted company; and the other, after suffering considerable damage, by the violence of the storms, was taken by an American frigate near the Coast.—We cruized a considerable time off Newfoundland, and in the Gulph of St. Lawrence, in hopes of falling in with our convoy; but to no purpose.—We endeavoured a great part of the month of November to get up to Quebec, but the Westerly winds prevailed so much, with frequent hard gales, and squally weather, accompanied with sleet, hail, and snow, that we were at length

length obliged to bear away for Halifax in Nova Scotia; our water being nearly expended, and a number of the men ill of fevers, colds, &c.—We arrived at Halifax in December, and on the 1st of January 1777 we failed on a cruise off Boston.

When we failed the weather was fine; but that night a most violent gale came on from the North-west with a heavy fall of snow, and severe frost.—The thermometer was at 46 that day at noon; and at twelve at night it had fallen to 22 degrees.—That night was one of the most tempestuous ever remembered by any person on board.—The ropes and sails became almost instantly so frozen, rigid, and unmanageable, that the top-sails could not possibly be furled, and were therefore necessarily cut away from the yards.—The braces, &c. so frozen, that it was with the utmost difficulty they could wear the ship, with the breakers of the Isle of Sable close under our lee.—In this dilemma, the sheet anchor broke loose, and before it could be cut away, it had considerably injured the ship's bow.—It would be tedious and useless to attempt to describe the various distressing circumstances that

occurred; in short, the commencement of our cruize was truly calamitous; and so it continued throughout with little variation: for from that time, till the latter end of March, we had literally nothing but stormy weather; gale succeeding gale with little intermission; and the greatest part of the time either snow, rain, or foggy weather.

We were soon driven so far off the coast as to be out of soundings, therefore the weather was not so intensely cold.—The West and North-westerly winds still prevailing, and our fore-mast sprung so that we could not carry sail, we never afterwards could get so near the coast as to strike soundings till the beginning of April; and on the 10th of that month we were so fortunate as to arrive at New York.

So much for nautical journal:—and this concise account I thought proper to premise, in order to account for the very distressing scenes which occurred on board during this unpleasant cruize—and now for the medical history.

The Scurvy began to make its appearance the latter end of January, and by the latter end of February upwards of twenty men
were

were so ill of this disease, as to be incapable of duty ; and many others complaining.—Two died of the Scurvy in this month.—In the course of the month of March the number of scorbutics increased, insomuch that we had from 70 to 90 on the sick list.—Eleven died of the Scurvy this month, and many were in the last stage of the disease, expecting every day to be their last. Several of them obstinately struggled against the disease, and endeavoured to keep their watches regularly, even when their legs were swoln, attended with ecchymoses ; their hams contracted ; their gums putrid and bleeding ; with their teeth loose, &c. yet in this state they kept on deck, rendering what assistance they were able, till they frequently fainted ; and it was sometimes with the greatest difficulty, that a fatal syncope was prevented for the present.

They gave two reasons for their persisting so obstinately in keeping on deck ; one was, that so few men being fit for duty, and consequently much fatigued, they wished to assist as much as they could.—The other reason was ; the idea they had, that, if they
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were once confined below, they must inevitably die.

In the beginning of April, the weather was rather more moderate; but the Scurvy continued daily gaining ground.—In the first week of that month five died of Scurvy.—On the 10th we got near enough Sandy Hook to make a signal for a pilot; and when the gun was fired, although every possible precaution was taken to prevent the effects of the shock on the scorbutics, two of them died instantly.

At this time we had not more than twelve men, exclusive of officers, free from evident symptoms of Scurvy:—even some of the petty officers were much afflicted with it. My second mate, who had never been at sea before, and was an indolent young man, was one of the first, who was afflicted with it; and notwithstanding every attention was paid to him, a natural indolent, slothful, disposition; added to an extreme dislike of a sea life, a desponding state of mind, and the concealment of his complaints till they had increased to a great degree, were the causes of the loss of this young man. He had the use of the Surgeon's necessaries as long as

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they

they lasted; and daily something fresh from the Captain's, or officers' tables, with wine, &c. yet he fell a victim to this dreadful disease.

With great difficulty we got into New York: and, as soon as the Admiral (Lord Howe) was made acquainted with our situation, he ordered immediately men on board to assist us in getting the ship into a proper berth, &c. and ordered all the sick to be sent on shore.—Upwards of 130, most of them in the last stage of the Scurvy, were sent to the hospital and sick quarters, as soon as accommodations could be got ready for them; and, although every possible precaution was taken to prevent syncope, many of them being carried in their hammocks, in a horizontal position; cordials given them before they were removed; and all the hatchways had been opened, with wind-sails down, as often as the weather would permit, that they might have as much fresh air as possible; yet, notwithstanding all these precautions, several of them fainted on their way to the hospital, and three expired. Several died after they had been some days on shore, although they were supplied with wine, and had plenty of oranges and lemons (several chests of which the Admiral ordered to

to be immediately purchased for them) together with vegetables of every kind; a proof, this, to what a dreadful degree they were afflicted with the disease.

All the principal causes enumerated as productive of Scurvy existed in a high degree on board of this ship while at sea; for, besides the people having literally nothing to eat but the common sea provisions, for *seven months*; except three times, that they were served with fresh beef at Halifax; and nothing to drink but grog and indifferent water, except some very weak spruce beer, with which we were supplied at the same place; the weather was uncommonly wet and tempestuous, the greatest part of the time: many of the crew had been impressed, but a still greater number of them were landsmen, and unaccustomed to a sea life; low-spirited, desponding, and badly cloathed; add to this, that a considerable number of them had been greatly reduced by fevers, rheumatisms, severe colds, and catarrhal complaints on the passage from England.—When these circumstances are considered, we cannot wonder that the Scurvy should rage with such fury.

The history of the medical treatment of these poor creatures while at sea will be very short—for I can only say, that in general I gave them bark, elixir of vitriol, cascarilla, myrrh, camphor, nitre, cream of Tartar, contrayerva, snake root, &c. In short every article in the medicine chest, that had either an antiseptic, tonic, diaphoretic, or diuretic, quality, or that was likely in the least to check the progress of this disease, was administered in the manner most likely to produce good effects; and varied according to symptoms and circumstances, as long as the medicines lasted.—I thought myself fortunate in having a considerable quantity of bark on board; (more than thrice the proportion usually sent in the medicine chests of 5th rates) and it certainly was of great service in checking the progress of the disease; but by no means adequate to the cure.—I gave it in different forms, as often and in as large doses as their stomach would bear it; those, who could take it with vinegar, seemed to receive the greatest benefit from it.

What little wine the Captain and officers could afford, was mixed with sago, water gruel, and sowins or oatmeal flummery. This last article is an excellent antiscorbutic;
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and if we could have supplied the men with a sufficient quantity of it, with sugar and wine, I am convinced the progress of the disease would have been checked immediately.—Flummery is prepared by mixing oatmeal and water in a certain proportion, and allowing them to stand till they become rather acidulous ; then the serum, or thinnest part is poured off, and the remainder boiled to a jelly.—There have been instances of this preparation alone preventing the Scurvy.

The greatest attention was paid to cleanliness, and airing betwixt decks ; fumigations with tar, tobacco, junk, &c. were frequently used, and the hammocks and bedding aired when possible ; but the weather was in general so extremely boisterous, that the hammocks could not be got up more than three or four times all the cruise ; and it was necessary to keep the hatchways in general battened down ;—frequently it happened that the *after* hatchway *only* could be opened for several successive days ; and at those times the horrid stench betwixt decks from such a number of half putrid bodies confined there ; the necessary buckets, that

were in constant use; together with the wet cloaths of the men, who came off the deck each watch; add to these the damp stores and the vapours from the bilge water, &c. in that warm, humid, confined atmosphere; it is not in my power to describe; therefore I shall only say, it was almost intolerable.

Under these circumstances, the wind and weather being such that we could not get into port; every thing we could call antiscorbutic being expended; no water in the ship, except in the ground tier, which it was hardly possible to get at; obliged to trust to the distillation of sea water; more than two-thirds of the people afflicted with Scurvy; some having already fallen victims to it; and many not likely to resist its remorseless fury many days; our situation now became truly alarming: and had not the wind favoured us so that we got into New York, most probably in the course of another week or two we should have lost the greatest part of the ship's company.

Porter was the only thing that seemed evidently to check the progress of the disease.—There were only two hogheads on
board,

board, which belonged to the Captain and officers; and on the 4th of March, after the bark, &c. were all used, I proposed that the porter should be distributed among the sick; and that every person, who had symptoms of Scurvy, should have a pint daily as long as it lasted.—This was cheerfully and humanely complied with, and notwithstanding the quantity was so small, it was astonishing to see the effects it had.—The number of scorbutics was so great, that the porter was all used in seven days; yet even in that short time, it seemed to arrest the disease, in its destructive career; and in some instances to give new life and vigour:—after the porter had been distributed in this manner for three or four days, the disease appeared in general to become stationary; and by the time it was all used, many, particularly those who were least affected, became evidently better:—indeed the scorbutics in general were in much better spirits after the use of the porter; which seemed to act as a specific in this disease, by restoring energy to the solids, and counteracting the septic tendency of the fluids.—This was so evident, that it is probable, if we could have continued the same daily allowance of porter

another week or two, several lives would have been saved.

We did not lose a man for a fortnight after the use of the porter ; which must be attributed entirely to the salutary influence of that liquor. For neither for some time before, nor after that period, did a week pass without one, two, or more, having paid the debt of nature.

I must just remark here, that in this instance we have a strong proof of the great utility of that excellent discovery, the distillation of fresh water from salt.—For some weeks we used no other water.—On banyan days we generally distilled from the spare copper ; and on other days, after the dinners were dressed, and the coppers cleaned, filled with sea water, &c. we began to distill ; which was continued till four or five o'clock in the morning, and in that time we commonly obtained 80 or 90 gallons, sometimes more, of good pure water.

We had but one apparatus on board ; but when a ship is supplied with one for each copper, there can never be any danger of a scarcity of water, while the fuel lasts.

Tea,

Tea, coffee, or cocoa, particularly in the East or West Indies, might be introduced into the navy, as articles of victualling, with great advantage; and would tend greatly to the prevention of Scurvy, and other diseases. With a pint of either of these, sweetened with soft sugar, and part of the allowance of bread and butter, (or molasses) a man would make a good breakfast; or if these are not allowed every day, they might be allowed three or four days in the week; and on the other mornings either burgoo sweetened with sugar; or, what would be preferable, a pint of sowins with sugar, and a gill of wine.

Tea is certainly preferable to coffee, as an article of sea diet, and as an antiscorbutic.

Coffee loses a considerable portion of its fixed air, (or of its nourishing and antiseptic principle) by being exposed to the action of fire in roasting; it likewise has an astringent quality, by which it increases that disposition to costiveness, so frequent among seamen, from the nature of their usual diet: whereas tea, loses very little of its fixed air in preparing it; it is known to be a strong antiseptic; to promote digestion; to possess

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an exhilarating quality ; to recruit the body and spirits after fatigue or want of rest, more than any other drink we are acquainted with ; and to be a good diluent.

Used moderately, it is perhaps one of the best qualifiers and correctors of a sea diet ; will seldom pall or offend the stomach ; and in colds or feverish complaints it is one of the most agreeable and useful drinks, that can be used.

Sailors, as well as their officers, and most other people, are fond of tea ; and although it may be prejudicial to persons of weak stomachs, whose nervous systems are delicate, and who eat but little solid food ; yet to men who work hard, whose stomachs are strong, but whose food is in general hard, difficult of digestion, and yields a viscid, glutinous chyle, tea must be an agreeable and useful diluting liquor.

The extraordinary success of that celebrated navigator Captain Cook in preventing the Scurvy during his long voyages, is a proof of what may be done.

Captain Cook's people, however, had many advantages, which are not enjoyed in ships of war in general ; such as a large supply of many kinds of preserved vegetables and fruits ;
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with essence of spruce, malt, sugar, molasses, wine, &c. &c. all which, I have no doubt, were used in the most judicious manner, and contributed greatly to the preservation of the health of his people: but I am equally certain, that if our men of war were supplied with those salutary articles in the same proportion; from the great attention of the Captains and officers to every part of their duty, the ship's companies would receive equal advantages; as the distribution of those articles would be equally proper and judicious.

Other material advantages attended Captain Cook's crew, some of which were, their being all chosen men; seamen in the prime of life; inured to a sea life, therefore less liable to the diseases incident to seamen; and being less numerous in proportion to the size of the ship; consequently less crowded than in ships of war; they were of course less prone to diseases arising from crowding people together:—and, what added to this advantage was, the ship being more lofty, in proportion to her size, than men of war, they could keep their hatchways and scuttles open longer; and would be less liable to have

the sea break in on their decks; circumstances greatly in favour of the health of the people.

When to the above circumstances we add the frequent large supplies of fresh vegetables of different kinds; of animal food, fish, &c. which they procured at the different islands, and other places, where they anchored; that they were never more than 117 days at any one time without such a supply; and even during that time they were not entirely without fresh diet, and good preservatives; that the greatest part of the time they were at sea, they were either in a warm, or a temperate climate; without excessive fatigue, or want of rest, having nothing but the common duties of the ship to do; no chasing, nor being called "*all hands to quarters,*" night after night; which frequently happens in ships of war, during actual hostilities.

When all these circumstances are considered, the health enjoyed by Captain Cook's people, will not astonish us so much, as that the same salutary supplies, and the same anxious care, should not extend to seamen in general in the navy; whose health, and
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lives, one would suppose, were equally valuable with those of the men sent on discoveries.

From what has just been said, I hope it cannot be supposed that I wish to detract in the smallest degree from the great credit and reputation which Captain Cook justly acquired in his attention to the health of his people; as well as from his sagacity and prudent conduct, in many trying situations. I revere and respect the memory of that great man, as much as any person; and there is no doubt but his regulations for the preservation of the health of his men were highly judicious and proper—but so much stress has been laid by some on the excellence of those regulations, as if to them alone was to be attributed the superior degree of health enjoyed by his people; without taking into the account the numerous and plentiful salutary supplies which I have just mentioned, and which appear to be the principal circumstances, which concurred to preserve the health of those circumnavigators, that I could not forbear mentioning them.

These, when contrasted with the circumstances and situation of the crews on board of many of our ships of war, who have
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been sent on foreign, unhealthy, stations, with little (frequently nothing) more than the ship's provisions, and the Surgeon's necessities, to solace them in the hour of sickness, or to recruit them in the state of convalescence; and on stations where the men have been harraßed with constant hard duty, and where few salutary supplies could be procured for them.—The above circumstances, I say, I have just pointed out to shew the difference betwixt a ship of war, and a ship sent on discoveries; and I am convinced that, if our ships of war, had been equally well supplied with antiscorbutics, &c., during the last, and former, wars, their crews would, in all probability, have been much more healthy; and many hundreds of useful lives would have been preserved.

It is greatly to be wished that ships ordered to the East, or West India stations, or on long voyages, should be provided with those preserved vegetables and fruits, which will keep best; besides a liberal supply of wine, porter, and materials for preparing salutary fermented drinks, and good fermented bread; such as have been mentioned before. Regular supplies should be sent them of such useful articles, as cannot be procured on the station.

station.—By such means I am convinced, that the men would be much more healthy than they have hitherto been ; and would in general be fit for duty on any emergency : and although the expence may at first view appear considerable ; yet, when we reflect that by a plan of this kind we should send fewer men to hospitals ; that fewer lives would be lost ; consequently there would be less expence in procuring recruits ; I think it would be found that the difference in the expence would be trifling,—probably *in favour of Government*.—But what is expence to a nation like this, where the object is *the preservation of the lives of its most valuable subjects* ?

It is well known that persons recovering from long illnesses, while they are in a convalescent state (unable to digest the common, gross, viscid, sea diet ; or to use much exercise) are exceedingly prone to become scorbutic. Wherefore it may not be amiss to recommend to young surgeons, who have not had much experience in this matter, a sedulous attention to the diet, and exercise, of convalescents ; and that they ought not to be too precipitate in striking their names out of the sick list. For, when
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once that is done, they are supposed to be fit for any kind of duty, and are treated accordingly.

I fear it has too often happened that men just recovered from fevers, &c. while they were yet in a debilitated state, and but just able to crawl about the decks; have been ordered to assist in duties, to which their strength was not equal; and when, on a little exertion, they have become fatigued and languid; they have been obliged to continue that exertion to the utmost of their power, even till they have fainted.—Although this may have the appearance of inhumanity; yet it has, I believe in general, been done with a good intention; as the boatswains and their mates frequently compel men to exert themselves, in order “*to keep the Scurvy out of their bones.*”—This is a mistaken notion, and ought to be discountenanced; for whatever their ideas of this matter may be, there is certainly a degree of cruelty in obliging a poor weak creature to undergo more labour and fatigue than he can well bear; instead of promoting his recovery, it no doubt, retards it; and, by keeping him longer in a debi-

debilitated state, he is more liable to become scorbutic.

It is the Surgeon's duty to remonstrate in these cases ; or rather to keep the men in the sick list, till they are perfectly fit for duty ;—indeed there are some kinds of duty, which require but little strength or exertion, which men may be put to, even while they are on the sick list.

On the other hand, the want of exercise is as injurious, as the excess of it ; and it has been observed, that where convalescents at sea are permitted to neglect using moderate, regular, exercise ; they soon become scorbutic ; and by continuing this conduct, the Scurvy is sure to make a rapid progress.

In the management of convalescents then, it is proper, besides giving them bark, elixir of vitriol, &c. as may be judged necessary ; that they should use moderate exercise, as walking, &c. at proper times, proportioned to their strength and condition ; when they are unable to walk on account of excessive weakness, lameness, &c. a swing in any convenient part of the ship might be used with great advantage.--It is a salutary, passive, kind of exercise ; and as in swinging the body passes through more air than in walking ;

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and undergoes a gentle, agreeable, kind of motion without fatigue; while at the same time the patient is refreshed, and acquires spirits; there can be no doubt but it would be found useful, not only in preventing Scurvy, but in promoting the recovery of convalescents.

A certain degree of bodily exercise is conducive to health, in all situations of life; but, when it is used to excess, so as to fatigue, it is hurtful; as it occasions a waste and dissipation of spirits, (which convalescents in particular cannot well bear) therefore relaxes and debilitates, instead of bracing and invigorating the body.

But there is another circumstance, which is, perhaps, of still greater consequence, in the management of convalescents; and that is their diet.—It has been observed, that where people just recovering from sickness, even in the country at a distance from the sea, have used a gross viscid diet, before they were able to use proper exercise; or before their digestive organs had recovered their tone; they have become scorbutic.—How much more likely then is this to happen at sea, where gross diet; the want of fresh vegetables;

getables ; and other causes of Scurvy exist commonly in a much greater degree than on land ?—It appears evidently necessary then, that people in a state of convalescence ought to be supplied with food of easy digestion, and of a bland nutritive quality, in order to nourish and strengthen the body as quickly as possible ; and at the same time to correct that acrimony in the blood and juices, which generally remains after diseases, particularly among seamen.

For this purpose they should have rice, barley or wheat stewed with currants or raisins ; sago ; rice and oatmeal gruels with wine and sugar ; sowins ; portable soup with four kraut and onions boiled in it.—One or other of these should be taken frequently in such quantities as not to oppress the stomach ; and where lemon or orange juice, or their extracts, can be added to any of the foods or drinks, they will be useful and palatable.—Yet, what would contribute perhaps as much as any thing to the recovery of convalescents, would be a sufficient quantity of good fermented bread.—With a slice of such bread, and a basin of tea, they would make a comfortable breakfast ; or they

might have panada, with a little fugar and wine feveral times in the day.

I cannot refrain, on this occafion, once more moft humbly and earneftly to recommend to the confideration of Government, the Plan propofed for constantly fupplying feamen with fermented bread and beer. Was it neceffary to produce any farther arguments to fhew the preference of good fermented bread to bifeuit; I need only mention that it has been found by experience that all farinaceous fubftances fimplly mixed with water, and baked, boiled, or in whatever manner they are prepared, (when daily ufed as food) are too vifcid and glutinous for people in general; and particularly fo for the fick or convalefcents, whofe digeftive faculties are impaired and debilitated.—Such fubftances mixed with water without undergoing any degree of fermentation form a glutinous pafte, which requires ftrong digeftive powers to fubdue; and even then will furnifh chyle of a vifcid inert quality, and not well adapted to the nourifhment of the body.—On the other hand, when they undergo fermentation by the addition of yeast, or leaven, they lofe their vifcofity and
glutinous

glutinous tenacity ; become soluble in water ; easily miscible with the chyle ; and acquire a degree of acescency, by which they become powerful correctors of a salted flesh diet.

I believe it is generally agreed, that the provisions in the British navy have always been preferable to the sea provisions of any other nation in the world ; but particularly of late years ; whether we compare them as to their quality, or the quantity allowed.—Notwithstanding which, it is a melancholy truth, that even while those provisions are in a perfectly sound state, and men are obliged to live on them for some time without fresh vegetables, or other correctors ; the Scurvy commonly makes its appearance ; and while the same causes continue, without proper remedies, or a change of diet, the disease gains ground daily ; whence the Scurvy is often seen to rage with great fury, while the provisions are yet sound, and free from damage.—This consideration is sufficient to shew that an improvement in the mode of victualling the navy is highly requisite. For as it appears that the usual sea provisions, even while in a sound state, contribute essentially in producing the Scurvy ;

what are we to expect from provisions, which have been kept so long as to be in a decayed state? where the biscuit is damp and mouldy; often full of weevils and maggots;—the flour and pease nearly in the same state;—the beef putrid, or nearly so;—the pork rancid;—and the water so extremely offensive, as only to be used from absolute necessity? Yet such circumstances are not uncommon at sea; and where they do occur, they must certainly contribute greatly to the production of Scurvy, and other putrid diseases.

All dry provisions are apt in time to become mouldy, damp, and unfit for use; they are likewise often in a manner destroyed by weevils; but particularly the biscuit, which is generally the first article of provisions that suffers from these vermin.—Every person, who has been any length of time at sea, must know, how very disagreeable it is to see numbers of these disgusting insects, as well as maggots, burrowed into every bit of biscuit; so that it is almost impossible to avoid eating them;—and the unwholesomeness of such food must be evident, when we consider how very acrid biscuit becomes by
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long keeping, particularly in warm weather ; that in weevils there is an acrid caustic quality, almost equal to that of cantharides ; and that when bruised and applied to tender skin, they will produce nearly the same effects.

Those insects generate likewise in flour ; but not so readily, nor so soon as in biscuit ; particularly if the flour is well rammed in tight casks, which it always ought to be.—But, even when there are a number of these insects in flour, it is an easy matter to get rid of the greatest part of them.—For which purpose it is only necessary to throw a quantity of the flour in a heap on a sail, the insects will immediately crawl to the top of the heap, which part may be sifted.—By stirring the flour up, and repeating this two or three times, very few of the insects will remain.—However, even if some of them should remain, when the flour is made into bread, their acrimony will be corrected by the action of the fire in baking ; and they will thereby be rendered less noxious.

I am aware it may be said that biscuit will yield more nourishment, and will go farther in a mess than the same weight of fermented

H 4 bread ;

bread ; we know likewise that it will lay longer in the stomach, as it is not so soluble, nor so easily digested as fermented bread ; and perhaps these are the only circumstances in favour of biscuit.—On the other hand, good fermented bread would certainly be much more wholesome than biscuit, particularly when used with the common, gross, sea diet ; flour will keep longer than biscuit ; it will cost less in freight, than the same quantity in the form of biscuit ; and the baking on board will be attended with very little expence.—When these circumstances are considered, it will appear that each man may be supplied with a pound (perhaps more) of good fermented bread daily, at a less expence than is incurred in the usual mode of supplying the navy with biscuit.

S E C T. VI.

Of the Cure of SCURVY.

THE means proposed for the prevention of Scurvy, will in general be equally useful in promoting the cure.—Substances, that act on the simple solids, by augmenting their energy, as nutritives of all kinds ; and medicines, &c. that operate on the moving fibres, as tonics, stimulants, diuretics, and sudorifics, are chiefly to be depended on.

The free use of fresh, succulent vegetables, particularly those of the alkalescent kind, as garlic, onions, celery, horse-radish, &c. are highly conducive to the cure ; they prove diuretic and diaphoretic ; being warm, gently stimulating, and containing a quantity of fixable air ; they tend to invigorate the solids, and to promote all the secretions and excretions.

Wines ; all kinds of malt liquors, particularly porter ; spruce beer, hop beer, cyder,

der, &c. as antiseptics and diuretics, are extremely useful in the cure of the Scurvy.

Acid fruits of all kinds, particularly lemons, limes, and oranges, and their inspissated juices, may be deemed specifics in this disease; if properly used, and in sufficient quantities.

Many excellent antiscorbutics may be preserved with coarse sugar, and made into a kind of conserve, &c. with very little expence; such as plums of all kinds; bullace, floes, currants, gooseberries, apples, crabs, pears, &c. or their expressed juices may be made into a rob by boiling; or preserved in different ways, as practised by confectioners; and they may be used either with bread, or mixed with burgoo, &c.; or good wholesome wine may easily be made by fermenting those extracts with water and sugar. Ships going on long voyages, or which are likely to be long without a supply of fresh vegetables, ought to be furnished with a proper quantity of some such preparations as those just mentioned: and they ought to be under the immediate direction of the surgeon; that the sick and convalescents may be

be supplied with them at proper times, and in proper quantities.

Portable soup seasoned with onions,* eschalots, or garlic;—rice with currants and sugar;

* If a good supply of onions were allowed as part of the sea stores, they would be an useful addition to pease soup, &c.—and in order to preserve onions it is only necessary, after they are removed from the ground at the proper time, and dried carefully in the usual manner, without bruising them, or injuring their external covering, to let them be spread on a malt-kiln, moderately heated; and let them be turned, so that every part of them may be exposed to the heat; when cooled, put them into dried casks, and they will continue good for some months.

As onions are warm, wholesome, antiscorbutic roots, they would be found very salutary in wet, cold, weather; in winter cruizes, &c.—A bit of onion, or garlic, eaten, or swallowed, raw in a morning, is said to be an excellent preservative against colds, and some other complaints.

Potatoes, carrots, parsnips, &c. may be preserved in the same manner, as onions; and they are good, wholesome, antiscorbutics.—Potatoes have been used in a raw state, eaten as cucumbers with vinegar, with evident advantage in preventing and curing the Scurvy; and as they keep so well, when properly prepared for preservation; they seem to be a very proper article of sea diet.—But attention ought to be paid to the kind of potatoes, as well as to the drying and packing them

fugar;—fago, or falop, with fugar and wine; with the addition of lemon, orange, or lime, juice, (when they can be procured); fowins or oatmeal flummery, with fugar and wine; are all good nourishing antifeorbutics; and, when they can be administered in fufficient quantity, the happiest effects may be expected from them.

There are feveral kinds of medicated, antifeptic, fermented drinks, which may be eafily prepared, daily; or, as often as may be requifite, for the fcorbutics; and, as the ingredients of which they may be compofed, are not only cheap, but of little bulk, every fhip ought to fupplied with them.

The following may ferve as a formula for an antifeorbutic drink, which may be altered according to circumftances.

Take of cream of tartar, 3 oz.

Juniper berries bruifed, 4 oz.

Ginger in powder, $\frac{1}{4}$ oz.

Cloves in powder, $\frac{1}{8}$ oz.

Coarfe fugar, or treacle, 5 lbs.

Water, fix gallons;

in casks, &c. for the mealy potatoes are much more eafily digefted, more nutritious, confequently more proper food, than thofe of a vifcid, tenacious, texture.

Boil

Boil them for half an hour ; then pour the whole into a tub ; and, when cool, let the liquor be passed through a strainer into a fix gallon cask ; add a little yeast, or half a pint of porter, (if there is any on board) and it will soon ferment.—It may be given a few hours after the fermentation is begun, from one to three pints daily, and will be found very grateful.

The proportions of these ingredients may be altered ; or the calamus aromaticus, gentian root, orange peel, or any of the bitter aromatic roots or herbs may occasionally be added.

Medicines appear to have but little efficacy in the cure of the Scurvy, unless assisted by proper diet and regimen.—However the Peruvian bark, Winter's bark, sarsaparilla, saffrafras, the decoction of the woods, ipecacuanha, opium, rhubarb, cream of tartar, the oxymel, and vinegar of squills, the Edinburgh squill pill, camphor, nitre, lenitive electuary, electuary of Cassia, tamarinds, &c. are occasionally found of great use in this complaint ; and ships ought to be well supplied with them ; particularly with the Peruvian bark.

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The vitriolic acid has long been esteemed as an antiscorbutic. I have used great quantities of it ; but cannot say I ever observed much advantage from it, except in the convalescent state after fevers, &c.—and then the elixir of vitriol given in conjunction with the bark adds greatly to the efficacy of this last medicine ; by increasing its tonic power, correcting alkalescency in the first passages, and occasioning the bark to sit easy on the stomach.—A little rhubarb occasionally added to this medicine will in those cases be found the best mode of obviating costiveness ; of clearing the bowels of their foul contents ; and at the same time promoting appetite and digestion.

The above, as a medicine, may probably be as useful in the Scurvy, as any ; particularly if liberally administered before the disease has made any great progress.

The muriatic acid * might probably be useful in preventing Scurvy ; but as I cannot
speak

* Having been informed by a surgeon of the army at New York, after our arrival there in the Richmond in 1777,* that the muriatic acid, or spirit of sea salt, was not only strongly recommended, but was used with great success in putrid complaints, by that judi-

* See the Account of the Richmond, p. 12.

ſpeak of its effects in this diſeaſe from experience, I wiſh only to recommend a trial of
it

cious and experienced phyſician, Sir W. Fordyce.—I determined to give it a fair trial as an antiſcorbutic the firſt opportunity. For which purpoſe I procured a ſufficient quantity, and intended, as ſoon as I obſerved any evident ſymptoms of Scurvy, to give it as often, and in as large doſes as the ſtomach would bear, without inconvenience. But I never had an opportunity of trying its effects in this diſeaſe. For, although we were ordered out on a cruize, as ſoon as our people, in general, were recovered on ſhore; and we had got a ſupply of men to replace thoſe, whom we had loſt by the ſcurvy; and although we were then ſeveral weeks at ſea, and were afterwards ordered to Virginia, where we paſſed the whole of the ſucceeding winter without a ſupply of freſh provisions of any kind, for the ſhip's company, having no communication with the ſhore; there was not the leaſt appearance of Scurvy on board: nor did it appear on board of any ſhip, to which I afterwards belonged.

The difference in the healthineſs of our people this winter, which we paſſed in Cheſapeak Bay, and the preceding one, was very remarkable; although the diet was nearly the ſame. I can only account for it in this manner—For two months, or more, in the ſummer, we lay at New York, and up the North River, where we had plenty of vegetables, and where the men had opportunities of going on ſhore at times to hawl the ſeine, &c. By theſe means the people had
acquired

it from its known efficacy in other diseases of the putrid kind. I have often used it in
putrid

acquired good wholesome juices, and being more habituated to a sea life, than the preceding winter, were not so likely to acquire a scorbutic diathesis. But what greatly assisted in preventing the Scurvy this winter was, that the men were better cloathed; the ship lay at anchor in different parts of the Bay the greatest part of the time, so that the men were not so liable to get wet as at sea; the hatches could almost always be kept open, the 'twixt decks dry and well aired, &c. the spirits of the men were kept up by frequently chasing French and American vessels, and the hopes of prize-money. But what I think must have contributed considerably towards the preservation of their health, was the water they used, which was brackish.

As it was dangerous to land on the continent, the only water, we could procure, was by sinking casks, with the heads taken out, on little islands, or rather sand-banks in the Bay, near the high-water mark, (a practice well known to seamen) and the water, which filtered through the sand, was what we used the whole winter.

This water contained a considerable proportion of sea salt; yet it did not purge the people; but it prevented costiveness; a complaint which seamen are often subject to, and by that means I am convinced it obviated the bad effects of the sea diet, which not only produces costiveness, but frequently glandular obstructions. Such is the difference between sea salt, when pure, or diluted, and salted meats.

When

putrid fore throats, both internally, and as an ingredient in gargles, with the greatest advan-

When his Majesty's sloop the Swift, was cast away on the coast of Patagonia, in March 1770, all the water we could find was brackish; of course we were obliged to use such all the time we were on shore in that inhospitable country; which was a month.—Some of the springs were more impregnated with salt than others, but they were all so much so, that we found in the vallies, at the bottoms of the little eminences whence the springs commonly issued, a quantity of good salt, which lay chrySTALLIZED on the surface of the mud; the humidity having been evaporated. This was the case even sixty or seventy miles up the river, where I accompanied Captain Farmer in exploring the country, both on the north and south sides of the river; nor did we see a vegetable of any kind, that we could possibly have eaten, even if we had been provided with utensils to dress it.—Indeed from the appearance of the country there is reason to believe that at no very distant period it has been overflowed by the sea.

Our people lived all this time on young sea lions, except when they were so fortunate as to kill some gulls, or other birds; which in general had a strong fishy taste; and having literally nothing else to eat, except half a pound of biscuit a day, (which was the only article of food we saved from the wreck) I apprehended they would have been attacked with some disagreeable complaints; which would have been the more distressing, as I had no medicines of any kind to counteract them.—However they were all extremely
 I healthy;

advantage; and have likewise found it useful in putrid fevers, when given freely in barley water, &c.

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healthy; indeed I do not recollect a complaint of any kind among the crew; except that some of them, after we were taken up by the Favourite sloop, were troubled with large blotches and boils.

The diet of the Captain and officers was much the same as that of the men, on this occasion; but the salt, which we got from the vallies, was a great acquisition to us, as it rendered the food less prejudicial, less unpalatable, and easier of digestion.

On the whole, I think the salt, and the saline springs, were of great use on this occasion.

The crew of the Richmond was very healthy all the summer of 1778. The only complaints worthy of notice were a few cases of dysentery, (which readily gave way to the common method of treatment) and the small-pox, which broke out on board, a day or two after we sailed from New-York in company with Lord Howe, on the expedition to the Chesapeak.—Some American prisoners which we had on board, and had taken about a week before in a vessel from New London, brought the variolous infection with them. Two of them were attacked with symptoms of the small-pox on the same day; and as soon as I was convinced of the nature of their complaints, I strongly recommended to Captain Gidoïn that the ship's company should be examined, and that all those who had not had the small-pox should be inoculated.—This was complied with, and I found about twenty, (Ame-
ricans-

The spirit of sea salt was strongly recommended by Dr. Addington as a specific in the Scurvy; likewise as the best preserver of water from corruption.—It is much more likely to prevent the Scurvy than to cure it. Therefore in situations where neither fermented drinks, fruits, nor fresh vegetables can be procured; it might be of use to give

ricans included) who had not had the disease.—These were immediately put on the most proper regimen in our power, took preparatives, were inoculated as soon as matter could be procured, and all had the disease in the most favourable manner.—One of the master's mates, a man who had lived freely (and who obstinately refused to be inoculated) took the disorder in the natural way; it proved to be of a very malignant, confluent sort, and he died on the 16th day. One of the Americans, who was first seized with the small-pox, likewise died. All the others did well.

It may be remarked, that all the time of our passage to the Chesapeake; and for some time after we got into the Bay, the weather was remarkably hot; the thermometer in the shade was seldom below the 80th degree of Fahrenheit's Scale.

In order to keep the small-pox patients as cool as possible, some of them had their hammaccoes hung up under the fore part of the half-deck; and the others under the boats and booms; where they enjoyed all the benefit of the air.

it to the amount of thirty or forty drops, or even more daily ; as it is probable it would, in some degree, counteract the septic quality of the salt provisions.

A P P E N D I X.

I HAD an intention to offer in this place some Observations on Fevers and Infections; likewise some Remarks on the imprudent practice which has prevailed in the Navy of sending on board of healthy ships, imprest men and others, just come from places of confinement, before they were properly cleansed, new cloathed, &c. but on looking over what Dr. Blane has written on these subjects, I find he has handled them so fully and so well; that what may be met with in his work *on the Diseases incident to Seamen*; together with the many useful observations, which Dr. Lind has favoured us with, seem to render what I intended to say, totally unnecessary.

Was there occasion at this time, farther to demonstrate the necessity of a careful attention to that part of the service which relates to the draughting of men from guardships, tenders, &c. I might produce many instances of dreadful ravages on board of ships, occasioned by the Ship Fever, (otherwise called the Jail, or Hospital Fever;) whose origin could easily be traced to the recruits, or other draughts of men, received at the ports where the ship's company had been completed.—However, as one instance which strongly applies to this purpose, and which perhaps cannot be equalled in the annals of the British Navy, happened to fall under my own observation; I must here beg leave to relate the particulars of it.

His Majesty's ship the *Tartar*, of which I was Surgeon, fitted out at Deptford in October and November 1770.—Among the crew, which consisted of two hundred men, there was a large proportion of good seamen; so many men having offered themselves, the officers had an opportunity of selecting the best; so that we were well satisfied with our ship's company.—On the 1st or 2d of December we received from the
guardship

guardship at the Nore two hundred impress men; with orders to carry them round to Spithead.—These, in general, appeared to be the refuse of mankind; poor, miserable wretches; with squalid, unhealthy, countenances; and other appearances, which bespoke their late release from jails, or other places of confinement; which, in fact, was the case of many of them.

Had the wind been favourable, so that we could have made our passage in a few days, in all probability we should have delivered the supernumeraries to the fleet at Spithead, in tolerable health; but after our arrival in the Downs, a gale of wind came on, with hail and snow, which continued some days: and after that time we had wet, stormy, and very cold weather, the remaining part of December and beginning of January.

Whenever there was the least appearance of a favourable wind, we prepared for sailing, and several times got under sail.—Three times we got so far as to be in sight of the Isle of Wight; and were as often driven back, by violent gales of contrary winds; so that we did not arrive at Spithead till the 15th of January 1771.

If we reflect on what the condition must be of a small low frigate, with a double complement of men (four hundred) upwards of six weeks on board ; one half of these always necessarily confined below, besides that part of the ship's company which was not immediately on duty ; in the depth of winter ; the weather wet, cold, and tempestuous ; consequently the hatchways obliged to be kept shut the greatest part of the time ; it will be evident that the situation of every person on board must be very uncomfortable.—But when to the above circumstances we add, that these wretched supernumeraries had neither bed, bedding, nor change of linen, many of them almost without shoes or stockings ; and, indeed, without cloaths sufficient to defend them against the inclemency of the weather, when they were necessarily allowed to go on deck ;—and that thus circumstanced they were almost constantly exposed to the deleterious effects of humid, confined air ; rendered more noxious by the exhalations from the bilgewater and hold of a ship just fitted out in a hurry ; together with the effluvia from their own bodies, and from the filth and nastiness

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unavoidably produced by many of those confined below, who were unaccustomed to a sea life—under these circumstances, I say, it is not to be wondered at, that they should be afflicted with fevers and other diseases.

It is not in my power to describe the various scenes of complicated distress on board, during the above period ; particularly the last week or two preceding our arrival at Spithead. Nor can I give any adequate idea of the uncommonly offensive smell betwixt decks, and which issued from the hatchways, when they were opened ; neither shall I attempt to give any account of the numbers taken ill of different diseases ; but shall only say, that the principal and most common complaint was the Ship Fever.—Many had catarrhs ; some had pleuritic and rheumatic complaints ; several became highly scorbutic ; others, had bad chilblains ; and a few were frost bitten, whose toes were in a gangrenous state, when they were sent to the hospital. Captain Glover was very averse to the sending any of them on shore at Deal ; knowing, that as soon as they were able, they would desert from the hospital, where there was no guard to prevent them. However, such
numbers

numbers became extremely ill in a short time, to whom it was impossible to administer any material relief, (circumstanced as they were, without bedding or common necessities) that I remonstrated to the Captain, and assured him there was but this alternative, “ *They must either be sent on shore immediately, or they must die on board.*”—Seventy-one were sent on shore at Deal, many of whom died. Three died on board; and when we arrived at Spithead, the sick list was truly formidable.

Every means in our power were used to prevent or check the progress of this dreadful calamity; the hatchways were kept open, with wind-sails down them, as often as the weather would permit; the ship was kept as clean as circumstances would admit of; swept, and dried betwixt decks; fumigated with tar, tobacco, or junk; and sprinkled with vinegar as often as we possibly could. As it had been asserted in several of the newspapers that the Tartar had the plague on board, and that a number of the men had died of that disease; Admiral Geary, who commanded at Portsmouth, very properly issued orders, that, on the arrival of the Tartar
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at Spithead, none of her boats should be allowed to go on shore; or on board of any ship; and that none of the boats of the fleet should be suffered to visit her, until a report was made to the Admiral, of the real nature of the disease which prevailed on board, by proper officers appointed for that purpose. Accordingly, soon after we anchored, three Captains and as many surgeons came on board, to whom I gave a full and satisfactory account of the cause, symptoms, progress, &c. of the prevailing disorders;—and as soon as their report was made to the Admiral, orders were given to send as many of the sick to Haslar hospital as might be judged necessary; and directions were sent to the hospital, to prepare proper wards for their reception.—Upwards of an hundred of the worst cases were sent to the hospital immediately; and others were sent as soon as accommodations could be got ready for them.—In short, three days after our arrival, the ship appeared almost unmanned, so few were left on board.—Many of these poor creatures died at the hospital.

We then began our operations for purifying the ship.—Every part below was well
 I . . . washed

washed, and scrubbed with warm water and soap; and when dried with swabs, the hatchways were all shut, covered close with tarpaulins, and every person being turned up from below, the hold, betwixt decks, &c. were well fumigated by means of brimstone thrown on charcoal fires placed in iron pots in different parts of the ship.—The smoke was confined below, as much as possible the greatest part of the day; and when, at length, it was nearly dissipated, fumigation with tar was used for some time.—For several days after this, fumigations with tobacco or tar were used daily; and repeated twice or thrice a week, for a considerable time.—After the parts betwixt decks had been repeatedly washed with vinegar, they were white-washed with quick-lime:—these, and every other means we could devise, were used to destroy the seeds of infection; but notwithstanding all our endeavours it appeared that we were not so successful as we had reason to expect, as several of the men fell ill of the same kind of fever, in the months of February, March, and April.

The above narrative is surely sufficient to evince the importance of the utmost care
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and attention in the management of recruits ; and to the means proper to prepare them for being sent on board of healthy ships ; as the smallest degree of infection brought on board by the person or cloaths of one man, may be the cause of much mischief.

What is principally necessary to be done for this purpose, is to strip every man, of whom there can be the least suspicion of being infected ; either from his having been lately in a jail, hospital, or even if he has been for some time on board of a crowded guardship, or tender ; to cut off his hair, and to wash him well all over with warm water and soap ; to destroy his cloaths, and to provide him with new cloathing.

The circumstance just related of the confinement of so many people in a small close place for so long a time, is alone sufficient to account for the production of this fatal fever ; but as some of the supernumeraries were attacked with it a few days after their coming on board ; from the peculiar smell of their cloaths, and from other circumstances, I have no doubt but they brought the infection with them.

It is well known that contagion will, *to a certainty*, be generated, by confining a number of persons together in a small space, without sufficient ventilation ;—and it may be occasioned merely by the confinement of the effluvia arising from their own bodies :—but when to these are added humidity, and noxious exhalations from filth, &c. this effect will be produced in a shorter time.

I do not know that the time necessary to produce contagion in this way, has ever been attempted to be ascertained ; but as that will depend on so many circumstances, *viz.* the number of persons confined ; the state of their lungs, and general health ; the closeness of confinement ; the humidity and general state of the air ; and other causes ; it will not be an easy matter to fix the time necessary for the generation of infection. It is sufficient to know that such causes will produce it, in order that they should be avoided.—Many well authenticated facts might be produced to shew that the effects of contagion are frequently sudden and evident ; and others, which prove that persons may often carry the seeds of infection about them for a considerable time, and that they will communicate

minate infection to others, before they themselves are sensible of its effects.

It was always a practice with me to visit the naval hospitals, when I had an opportunity, and to get what information I could relative to the regulations and general management of the patients in those useful institutions ; and as I always made a memorandum of whatever appeared to me to require improvement, with any observations and remarks which occurred to me at the time ; I had collected a number of those, thinking it possible that they might, at some future time, be useful to myself, or to others ; but I was so unfortunate as to have these, with all my other papers, journals, books, and baggage of every kind ; burnt in the Supply storeship at St. Kitt's, the day after I had embarked on board of her, in order to return to Europe.

The remarks I had made related chiefly to the hospital on Long Island ; and to that at English Harbour, in the Island of Antigua. This last, appeared to me to stand greatly in need of improvement ; and although we ought not always to form our opinions of the healthiness or regulations of an hospital from
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the number of patients who die at any particular time ; yet, at the time I was at Antigua, it was evident to me that great improvements might be made in the hospital establishment ; by which many valuable lives might annually be saved.—Perhaps the great mortality among our people at this hospital, might have tended to confirm that opinion ; but I was so convinced of it at the the time, that I fully intended, on my return to England, to submit to the consideration of the Commissioners of Sick and Hurt, what observations I had made on this subject ; together with some proposals for improvement :—but having lost my papers by the above accident, and being in a very indifferent state of health for some time after my arrival in England, I gave up my intention.—They appeared to be very deficient in two material articles at the hospital, *viz. good wine and fruits* ; the want of which the great assiduity and attention of the surgeon could not compensate.

As I have mentioned the mortality among our people at Antigua, and shall always regret the loss of so many fine fellows, I shall
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take the liberty just to mention some circumstances relating to that event.

At the time alluded to, I was surgeon to his Majesty's ship the *Preston*, commanded by that excellent officer Commodore (now Admiral) Hotham. Perhaps few ships ever went to sea with a better ship's company or in higher order and discipline ; and from the time of our sailing from New York in November 1778, on the expedition against St. Lucie ; and after the reduction of that island, cruizing betwixt it and Martinique, &c. till April 1779, when we arrived at English Harbour, in order to heave the ship down ; we scarcely ever had a man incapable of duty from sickness.

When we entered English Harbour, out of 367 men (the ship's complement) not a man had the smallest complaint.—About a fortnight afterwards several of them were on the sick list with bilious remitting fevers ; and after that time few days passed without some of them being attacked with that disease.—Of those whom we sent to the hospital, upwards of thirty died.—A great number of the sick were accommodated in the best manner we could in the capstan house.—All

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those who complained immediately on the first seizure; who took their medicines regularly, and observed the directions given, recovered.—We lost but three of those who remained in the captain house, and one of those was the chaplain, a worthy man, but who fell into such a state of despondency from the first attack of the disease, that he could not be prevailed upon to take any medicine whatever (except a gentle emetic and some small doses of Dr. James's Powders) and died on the fifth day.—The other two were seamen, who had concealed their illness too long, supposing it to be the effect of too much liquor.

As this is the kind of fever which most commonly occurs in warm climates, I shall just mention the mode of practice which I always found most successful; as it may be of use to young surgeons or others not acquainted with the diseases of warm climates, and who may not be in possession of the best authors on this subject.

Sickness at stomach being an almost constant symptom at the beginning of those fevers, I always gave an emetic immediately, except in plethoric habits, where the pulse
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was full, tense, or throbbing, and where there were inflammatory symptoms;—in these cases I commonly took away some blood previous to the administration of the emetic.

After trying different emetics in various forms, I found the emetic tartar dissolved in water, and given in divided doses at proper intervals till it operated freely, answer the best. It always cleared the stomach effectually of bile, &c. and frequently occasioned a free discharge from the bowels downwards:—but where this did not happen, or the discharge was not sufficiently copious, I commonly prescribed an opening medicine to be given as soon as the patient's stomach was a little settled.

After repeated trials of saline purgatives, rhubarb, castor oil, &c. what appeared to answer best was a purging powder, which I always kept ready prepared, and which was composed of chryst. tart. part. ij. rad. jalap. pars j. mixed and reduced to a very fine powder;—of this I usually gave from ʒss. to ʒj. and it seldom failed to procure some stools, and to relieve that load and oppression about the præcordia which is a common symptom in these fevers; and

which appears to be occasioned by an accumulation of bile in the gall bladder, or in the cystic or hepatic ducts, as the patients commonly found themselves considerably relieved after a few bilious discharges.

Afterwards, in order to promote perspiration, antimonials in small doses, and free dilution with warm drinks, were had recourse to; and after each dose of the antimonial medicine, I commonly gave three or four spoonfuls of a saline mixture, or half an ounce of the spiritus Mindereri diluted. This last I found to be an excellent diaphoretic, and the manner in which it was commonly administered, was simply by mixing a table spoonful, sometimes more, of it, with a cupful of sage tea, the moment before it was taken.

With these, and plentiful warm dilution, a free perspiration was generally excited, which commonly brought on a remission of all the feverish symptoms in ten or twelve hours; and as soon as that was evident, the bark was given in as large doses and as often as the stomach would bear it.—From which time, in most cases, the patients continued to recover.

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However, we were not always so successful—for many instances occurred where there was no remission for twenty-four hours, or even for some days.

In patients where the symptoms were violent at the beginning of the complaint, with great heat, dryness of skin, anxiety, &c. after the operation of the emetic I often gave calomel and Dr. James's Powder combined, five or six grains of each in a bolus; if this medicine did not operate downwards in a few hours, I gave a dose of the purging powder; which never failed to produce some offensive bilious stools;—and as soon as this was accomplished, the diaphoretic course was resorted to.

In some cases where the emetic did not afford the usual relief; after having operated freely; and where there remained considerable oppression, with so much nausea at stomach, that there was reason to think the purging powder would be rejected; I commonly gave four or five grains of calomel in a pill, and if it did not produce a stool or two, in a few hours, I gave a dose of the purging powder. These usually had a good effect in clearing the bowels, relieving the

nausea, and irritability of the stomach, and in preparing the patient for the diaphoretic course.

It happened likewise, in some instances, that where calomel was not given at the beginning of the fever, it became necessary either to give it, or a brisk dose of the purging powder (sometimes both) even some days after the first attack of the fever, on account of a sensation of weight and oppression which they complained of about the stomach and hypochondria in general;—and the bilious discharges which these medicines procured were commonly very copious, and generally relieved the patient considerably.—After which diaphoretics were given, and an opportunity watched for administering the bark; which was done freely on the first *certain* appearance of a remission.

In cases where the disease was protracted beyond the fifth or sixth day; after proper evacuations had been used, and the diaphoretic course had been pursued without producing a remission, or any sensible relief of the symptoms; it was necessary not only to repeat the emetic, but the calomel bolus and purging powder; and after the operation of these,

these, I always gave an anodyne, in order to quiet the commotions occasioned by the purgative; and to recruit the patient's strength by rest and composure. Anodynes were likewise given occasionally with great advantage at the beginning of the disease, after proper evacuations; particularly where these were copious; and seemed to fatigue, or weaken the patient,

In patients affected with delirium, (which symptom sometimes occurred very soon after the attack) besides bleeding, where the symptoms required it, and the other remedies which have been mentioned, blisters were found extremely useful.—Camphor, nitre, and anodynes were likewise occasionally used in these cases with great advantage.*

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* As I was attacked with this fever myself, I might have related my own case, with the mode of treatment, as a specimen of the general practice which I pursued in those fevers.—However, as a short detail of the principal circumstances may possibly be of use to some practitioners inexperienced in the treatment of diseases of warm climates; I shall give it, without entering into a tedious and useless narrative of every minute circumstance.

There were but few cases in which I durst venture to bleed.—Indeed it is an operation

Previous to the actual accession of the feverish symptoms, I had perceived, for some days, a languor, listlessness, want of appetite, and some degree of head-ach. But having been often slightly indisposed after my last arrival in the West-Indies, I paid little attention to these symptoms; till one evening, while I was visiting the hospital, I found an universal rigor, with a weariness and pain in my limbs, nausea, oppression, and an increased head-ach.—I was a good deal alarmed, and immediately returned as expeditiously as I could, to my apartment in the captain house.

It is probable that the duration of the rigor and cold chills, usual at the beginning of fevers, were shortened by the violence of the exertion in walking from the hospital to my room; but the nausea, anxiety, and inquietude, which succeeded, were very distressing.

I immediately took the emetic tartar in divided doses as I have already mentioned, which operated very well both as an emetic and as a laxative. Having lain on my cot about an hour after the operations of the emetic, and finding a disagreeable inquietude and anxiety remain, together with considerable heat, thirst, head-ach, and oppression about the præcordia, I took a bolus composed of Dr. James's Fever Powder and calomel, each six grains, and a sufficient quantity of conserve of hips. After this, I waited more than

ration which never ought to be performed in a warm climate without well weighing and

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two hours; and finding no effect from what I had taken, knowing the consequence of the loss of time in those cases, and being impatient to obtain relief; I then took two scruples of the purging powder, washing it down with half a pint of warm, thin gruel; and in the course of a few hours a great quantity of bile was discharged.—I afterwards took seven grains of the fever powder in a bolus, which I repeated every six hours; and in the intermediate time, I took two (sometimes three) doses of the spirit. Mindereri in warm sage tea; or, when I found my stomach nauseate the Mindererus's spirit, I took, instead of it, a saline draught in the state of effervescence; and diluted freely with warm tea, made of the common wild sage, which grows in great abundance in the West-Indies, and which I thought a most agreeable diluting drink.

By these means a free perspiration was produced; and next day, after the perspiration had been kept up for nine or ten hours, I fancied the fever considerably abated;—indeed there was evidently a remission, but I did not think it so perfect as to venture on taking the bark:—therefore I persevered in the antimonial diaphoretic course, and free dilution, till the day following; when I was so well satisfied with the remission of all the feverish symptoms, that I took a large dose of the bark in powder, and intended to have repeated it every two hours, or, as often as my stomach would.

considering the symptoms and circumstances of the case; as the loss of a few ounces

would bear it; however, on taking the second dose, I found it to nauseate, and rather to sit heavy on my stomach; therefore I had a strong decoction of bark prepared, of which I took a cupful, with a few drops of the elix. vitriol. as often as I could.

I continued to take the bark in this manner for some days, and occasionally added a little rhubarb;—but finding I began to get tired of this medicine, I had a cold infusion of the bark prepared (one ounce to a pint of water) to which I added an ounce of Huxham's Tincture of Bark.—This sat easy on my stomach, and I was able to take a pint of it daily.—In a week or ten days I lessened the quantity, and by degrees left off taking it in that regular manner.—By these means I recovered considerably; however I took some doses of bark every day, or every second day for some time afterwards.

Notwithstanding the above, and every other means in my power were used for the re-establishment of my health; yet, as I found the accomplishment of it (if ever it could be acquired in that climate) would be tedious and uncertain, I requested leave to return to Europe, which was immediately granted through the intercession of Commodore Hotham; and Admiral Biron, who then commanded on that station, ordered that I should go in the Supply storeship, then ready to sail with the convoy for England; and on board of which there were a number of officers, who were likewise on their return to Europe, on account of ill health.

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ounces of blood may, and often has occasioned irremediable mischief, by inducing such languor and debility as the patient has never been able to overcome; or, if he has not sunk under the weakness, or the disease, his recovery has been slow and tedious.

Nothing but certain signs of present inflammation; attended with a full, hard, vibrating pulse; together with a full plethoric habit, can warrant the propriety of blood-letting in a hot climate.—Many years ago, I saw two instances in which it was evidently injurious; and, I hope, I profited thereby.

It may not be amiss to remark here, that sailors in general, do not bear bleeding so well as officers, or those who fare more sumptuously; particularly in warm climates.

In the general outlines which I have given of the treatment of the bilious remitting

The day after I embarked on board the Supply, off the Island of St. Christopher, she, by some accident, took fire, and was totally burnt. In consequence of this accident I lost all my baggage, &c. as mentioned before; and returned to England in the St. Alban's, commanded by Captain Onslow.

fever,

fever, at Antigua; there is but little difference from the practice which I was accustomed to several years before, in the West-Indies; and with which I had reason to be satisfied, from the success attending it.

In the year 1763, when I was surgeon's mate of the *Renown* frigate in the West-Indies, the ship being ordered to the Havana, we left the surgeon (who was ill) at Jamaica; and during our absence from that island, which was near five months, I had from twenty-five to sixty patients on the daily sick list; and the most common complaints were fevers.—Some few of these were intermittents; but they were chiefly of the bilious remittent type.—In the course of this time, we likewise had many cases of dysentery; and of foul, obstinate, ulcers.

Having no person to assist me in the care of these people, except two of the men who were ordered to attend me, and who were likewise to prepare drinks, &c. for the sick; I found my situation very uncomfortable; and was so much employed below, as to have but very little leisure for the necessary exercise and air.

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We lay in the Havannah harbour from the beginning of May till the middle of July. The sun being nearly vertical all this time, with frequent heavy rains, and extreme heat, we were more sickly at this period than at any other ; having seldom fewer than fifty on the sick list ; and as there was no naval hospital at the Havannah, I was obliged to take care of them, as well as I could, on board.

Notwithstanding my confinement and fatigue, I was so happy as to enjoy good health ; and what added greatly to my satisfaction was, that we did not lose a single man by sickness, the whole time.—I attribute this, in great measure, to the generosity and humanity of Captain Maitland, who constantly supplied the sick with what wine I thought necessary for them.—Perhaps the few refreshments we procured from the town, might likewise have contributed.

I wish it to be understood, that I do not pretend to claim any merit from the success which attended the medical treatment of those patients at the above period. I was at that time but little acquainted with the diseases of warm climates ; and there was no person whom I could

could consult on the occasion.—Previous to that time, I had seen but a few cases of the bilious remitting fever which occurred on board the Renown, soon after we first arrived in the West-Indies; and which I treated under the direction of Mr. Irving, the surgeon of the ship; therefore it cannot be supposed that I had discovered any superior method of practice.—On the contrary, I was extremely diffident, and often afraid of acting wrong, in particular cases.—I endeavoured to acquire some knowledge from medical books; and although I had some of the most approved authors on board; I soon found, that with respect to the diseases of warm climates they only tended to mislead.—I was therefore obliged to trust to the observations I had an opportunity of making in a sickly ship, and to make up, by diligence and attention, what was wanting in judgment and experience.—The success exceeded my expectations.—Of 220 men, the ship's complement, there were very few who escaped either fevers or fluxes, while we lay at the Havannah; some were dangerously ill, and their recovery slow and tedious; but *they all got well.*

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I am happy in the opportunity of thus publickly acknowledging my obligations to Dr. Thomas Denman, now phyfician in London ; but who was at that time furgeon of the Edgar at the Havannah ; for fome valuable practical remarks, on the difeafes of warm climates, which he was fo obliging as to communicate to me ; and for his readinefs in coming on board the Renown twice, at my request, to affift me with his advice, in the treatment of fome dangerous, and uncommon cafes.

I have been the more particular in the foregoing account, as it will tend to fhew what affiduous care and attention will fometimes do in the management of fick feamen. —And as an encouragement to diligence and exertion in others, who may be in a fimilar fituation, I fhall juft mention, that while I had the fatisfaftion to think that I did my duty ; I found myfelf amply rewarded for my fatigue and trouble, by the gratitude of thofe I had attended, and by the approbation of the Captain, and every perfon on board.

On our return to Jamaica, I was fo particularly recommended by Captain Maitland to
Sir

Sir William Burnaby, (who then commanded on that station) that I was appointed to the first vacancy for Surgeon, which happened in the squadron.

It may appear unnecessary at this time, when the navy is in such high order and discipline, to recommend attention to cleanliness; but it is of so much importance to the health of seamen that they should keep their persons clean; and that their cloathing and bedding be kept not only clean, but *dry*; that a strict observance of this part of sea discipline cannot be too much insisted on.—Instances might be produced where inattention to those matters, has been productive of bad consequences.

Enough has already been said on the subject of keeping ships clean; indeed, I believe there is great attention to that point of duty in most ships; but I fear there has not hitherto been sufficient care taken in drying the decks, &c. and in preventing the bad consequences of evaporation and humidity. The method I have mentioned of using iron pots and charcoal fires, will be found to answer perfectly.—Brodie's stoves, which are now in use in the navy, may perhaps give
less

less trouble ; but as I have never seen them used at sea, I cannot say how far they will answer.—However, I am happy to find that some method is adopted for preventing that constant humidity betwixt decks, which is so disagreeable and pernicious, particularly in bad weather.

A due regard to the above circumstances appears to me to be of the greatest consequence :—for what would avail the greatest assiduity and skill of the surgeon in endeavouring to prevent or cure diseases, if the officers are inattentive to the cleanliness, &c. of the ship and her crew.—On the other hand ; when, unfortunately, an infectious fever has got among a ship's company, (whether the contagion was generated on board from filth, foul, confined, air, &c. or was conveyed on board by any means whatever) unless the surgeon performs his duty with assiduity and judgement, the attention of the officers to cleanliness and good order, will be of little use, in checking the progress of the disease, or in destroying the infection.

When it appears that any of the people are actually attacked with a fever of an infectious nature, the sick should immediately

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be separated from the healthy, as much as possible. The most retired part under the fore-castle, on one side, is the most proper place for men with such complaints; and no person ought to be suffered to have communication with them except those who attend them.—The healthy part of the ship's company should be cautioned to avoid all intercourse with the sick; and it ought to be particularly recommended to them, that the moment they are sensible of any indisposition, they should make it known to the surgeon.—This would be attended with two advantages; for by an early knowledge of their illness, they could be separated so soon from the healthy, as perhaps in some degree to prevent the infection spreading; and by an early attention to their complaints, they would have a better chance of recovery.

Washing with vinegar, fumigations with tar, tobacco, &c. and the other means of destroying infection, and preventing sickness from spreading, which I have related as having been practised on board the *Tartar*, ought to be diligently attended to.—And when a man dies on board of an infectious fever or dysentery; his bedding, cloaths, and every thing

thing that was about his person during his illness, ought to accompany the body over-board.—Even when men recover of these diseases, every precaution should be taken to prevent infection being caught from their cloaths, bedding, or hammocks; (as these are more retentive of the subtle poison than the persons of the men.)—They should, therefore, either be destroyed, or should be well scrubbed, or washed with warm water and soap, and fumigated before the men mix with the rest of the ship's company.

When men are sent to hospitals with such diseases, their bedding, cloaths, &c. should be sent with them, and ought to be well smoked and purified at the hospital.—Or if any thing which they had about their persons during their illness be left on board, they should be cleansed and purified as much as possible.

It may be presumed that infection is more likely to generate among the sick, than among the healthy; for which reason the surgeon and his mates ought to take particular care that those whose duty it is, keep the sick berth clean and dry; and when there are many sick, the berth ought to be sprinkled and fumigated with vinegar fre-

quently.—This will be found useful even where free ventilation can be used.

The situation of a sick berth is of great consequence.—The usual places allotted for this purpose are under the forecastle, or on the fore part of the lower, or middle gun decks, according to the rate of the ship.—But in my opinion, under the forecastle in all ships, is the most proper place.—It has been objected to this, in many ships, that the cook-room being so contiguous, the sick and the cooks will incommode each other, &c.—But it is known from experience, that if the sick-berth is inclosed with double canvas, or hammocks, every inconvenience of that kind will be prevented.—The canvas should be laced to a pretty deep kant, which must be fixed to the deck, and well caulked underneath, to prevent water getting into the berth. Clean canvas ought to be put up, at least once a week.—A round-house for the use of the sick ought to be inclosed within the berth, so that there will be no occasion for necessary buckets.

As soon as a man is taken ill, particularly of a fever, he ought to be removed into the sick berth; and it would be of great use to
such

such people if a bathing-tub was provided, in which they might be bathed and well washed with warm water and soap, before they are put into bed.—If this could be done, it would, by cleansing and relaxing the skin, greatly contribute to the recovery of the men.

Many alterations and improvements in the the surgeon's necessaries have been proposed, therefore, all that I shall say, at present, on the subject is, that as cinnamon, mace, and nutmegs are useless and expensive; and there is reason to believe that they are sweated of their oil before they are sold to us; it would be an useful alteration, if, instead of these, a larger proportion of sugar, barley, sago, rice, and linen cloth, were allowed.—I think this would be a great improvement, and I do not know that it has been proposed before.

It is greatly to be wished that more encouragement was given to navy surgeons, and to their mates; as by that means more men of real abilities would be induced to enter into the service.—But as this subject has been the topic of much conversation; and the hardships and inconveniences which surgeons labour under, have been humbly, and very

properly represented to those, to whom alone they can with propriety apply for redress; I shall not presume to offer any new arguments in favour of their claim to additional pay, or to an extension of half-pay:—but shall take the liberty to transcribe the following passage from Dr. Blane's excellent Work on the Diseases incident to Seamen.

“ Surgeons are, perhaps, more regarded in our service than in that of other nations; but it would be for the public benefit if they were still more respected and encouraged. To men of liberal education and sentiments, as surgeons ought to be, and generally are, the most effectual inducements for them to do their duty are flattering attentions, and a certain degree of estimation in the eyes of their officers.—Liberality of manners on the part of superiors is the most likely means of encouraging a conscientious performance of duty; for though strict and distant behaviour may operate upon the minds of those whose functions are merely mechanical, how can it infuse that tender attention to human sufferings, and that sense of duty, which may induce a man entrusted with the health and lives of his fellow-creatures to act his part with propriety and effect?”

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Was sufficient encouragement given to navy surgeons, the most beneficial consequences might be expected.—After entering into the service, and making themselves perfectly acquainted with the means that have been found most conducive to the prevention and cure of diseases on board of ships; and endeavouring to promote the practice of them, to the utmost of their power; I have no doubt but they would assiduously apply their minds to the discovery and practice of new and improved means for the preservation of the health and lives of those entrusted to their care.—For, as has been observed before, many improvements have been made, and much has been done, towards bringing this essential business to perfection; yet, I am sorry to say, much still remains to be done.

The importance of this great national object has already been sufficiently explained; and from the great number of intelligent, and ingenious officers, as well as surgeons, at present, in the navy; it is reasonable to expect some hints for improvements in the means already known; or, perhaps, something new may be proposed.

There is likewise great reason to expect improvement in those matters from the great attention of the Victualling, and other Boards, to every circumstance belonging to their respective departments.—And as a sea life, considered merely as such, cannot be said to be productive of diseases, but, on the contrary, has cured many ;—and instances might be produced where people have enjoyed a more uninterrupted state of good health at sea, than has been known of an equal number on land ; (which, I believe, would commonly be the case was the diet equally salutary with what is generally used on shore.) —All these circumstances, I say, when considered ; and when due attention is paid to the means proposed, and to those which we may expect will be pointed out for the preservation of the health of seamen, we may almost venture to say with the Poets,

—— *Nec morti esse locum* ——

VIRG.

No room is left for Death.

DRYDEN.

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CONCLUSION.

*Containing some additional REMARKS and
OBSERVATIONS.*

AFTER the foregoing sheets were sent to the press, in looking over a book, just sent me by a friend, entitled “ A Maritime State considered, as to the Health of Seamen, &c. by Charles Fletcher, M. D. late Surgeon in his Majesty’s Navy,” published in 1786, I noticed the following observation :

“ The celebrated Dr. Cullen seems to think, that as alkalescency has great share in the production of Sea Scurvy, so salt, *any way taken*, may increase that tendency,

“ dency, even supposing such salt to suffer no
 “ change in the system, *the effects of it may*
 “ *be* considerable. And this will be rendered
 “ still more probable, if it may be presumed,
 “ that all neutral salts consisting of a fixed
 “ alkali are changed in the body into an am-
 “ moniacal salt, which the Doctor appre-
 “ hends to be that especially prevailing in
 “ Scurvy.”

This naturally induced me to examine what Dr. Cullen had said on the subject.—I confess, that although I have been in possession of his *Practice of Physick* ever since its first publication, I had not consulted the Doctor’s sentiments of the Scurvy, when I wrote the preceding Essay; and for this reason, that I had determined to confine myself to practical observations and facts; to point out, to the utmost of my power, the most probable means of preventing that disease at sea; and to avoid all theoretic reasoning as much as possible.—I therefore did not suppose that I should meet with much information from a regular, scientific, work, like that of Dr. Cullen.

As the doctrine mentioned above, seems rather to militate against what I have said of
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the effects of sea salt taken into the body ; I think it necessary to take notice of it :—and although it must always be with the greatest reluctance that I should presume to dissent in the smallest degree, from any doctrine laid down by that great man ; yet, as the opinion he has given of the proximate cause of Scurvy, does not, in some respects, exactly agree with the ideas I had formed ; I shall, here, take the liberty to make a few observations on that subject ; particularly on the share which salt may be supposed to have in the production of that disease.

So many ingenious, plausible, theories of diseases ; like many great and populous nations, have had their rise, acme, and decline ; that I hope I shall be pardoned when I say, that I have but a very indifferent opinion of theories in general.—Indeed there are but very few of them which have appeared to me satisfactory ;—and although I shall always pay the greatest deference to any opinions advanced by men of abilities and application ; yet, if they are not supported by practical observations and facts, I must be excused, if I have my doubts.

Dr.

Dr. Cullen, when considering the remote causes of the Scurvy says, .

“ The most remarkable circumstance
 “ amongst the antecedents of this disease is,
 “ that it has most commonly happened to
 “ men living very much on salted meats ;
 “ *and whether it ever arise in any other cir-*
 “ *cumstances, is extremely doubtful.*”

I have no doubt but the Scurvy may, and often has been produced by diet, deficient of the nourishing principle without the use of salted meats ; many instances of which might be produced ; and I shall presently take the liberty to mention a few.—I shall readily admit that living much on salted meats is (and I have already mentioned this as) one of the principal pre-disposing causes of Scurvy ; but I cannot suppose that the same, *or twice the quantity*, of pure salt taken into the body, along with wholesome fresh food, would produce the same effects.

“ These meats are often in a putrescent
 “ state ; and to the circumstances of the
 “ long continued use of animal food in a
 “ putrescent and somewhat indigestible state,
 “ the disease has been especially attributed.
 “ Whether the circumstance of the meats
 “ being

“ being salted, has any effect in producing
 “ the disease, otherwise than by being ren-
 “ dered more indigestible, is a question that
 “ remains still in dispute.”

The long-continued use of animal, or any other food, in a state of putrescency, will no doubt dispose to the Scurvy; particularly, if such food is not easily digested, yields but little nourishment, and *that* nourishment is with difficulty assimilated, and applied to the uses of the body. And it appears to me reasonable to suppose, that the long-continued use of animal food, in the state above described, even where no salt is used, would produce similar effects. Or, if salt in such circumstances, increases the scorbutic diathesis, it is by hardening the meat, thereby rendering it more indigestible; and perhaps, by destroying in some degree its nourishing principle.

“ It seems to me, that salt concurs in pro-
 “ ducing the effect; *for there is hardly any*
 “ *instance of the disease appearing unless*
 “ *where salted meats had been employed,*
 “ *and scarcely an example where the long-*
 “ *continued use of these did not produce it;*
 “ besides all which, there are some instances

“ where, by avoiding salted meats, or by di-
“ minishing the proportion of them in diet,
“ while the other circumstances remained
“ much the same, the disease was prevented
“ from appearing. Further, if it may be
“ admitted as an argument upon this subject,
“ I shall hereafter endeavour to shew, *that*
“ *the large use of salt has a tendency to ag-*
“ *gravate and increase the proximate cause of*
“ *Scurvy.*”

Many instances have occurred, as I have already stated, of the disease appearing where salted meats have *not* been employed; and there are numerous examples where the long continued use of these, when accompanied with vegetable correctors, did *not* produce the disease.—What is said of preventing the disease from appearing, by avoiding salted meats, &c. is very just; I have seen many instances of it:—But I believe it was not so much owing to their taking in a smaller quantity of salt; as to their avoiding meat in a putrescent state, and using a larger proportion of vegetable food.—For the consequence of abstinence from animal food at sea, is always an increased use of the vegetable articles of diet.

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That the large use of salted meats have a
 “tendency to aggravate and increase the
 “proximate cause of Scurvy,” must be al-
 lowed; but I have, as yet, found no argu-
 ment to prove, that salt, *when used in its*
pure state, in any quantity, with fresh,
 wholesome, animal or vegetable food, has
 the least tendency to cause, aggravate, or in-
 crease the Scurvy.

What the Doctor has said of the tendency
 of the fluids to putrefaction; and that “in
 “man, whose aliment is of a mixed kind, it
 “is pretty certain, that if he were to live
 “entirely upon animal food, without a fre-
 “quent supply of vegetable aliment, his
 “fluids would advance farther towards pu-
 “trefaction than is consistent with health,”
 appears very just and reasonable; and I have
 no doubt but living entirely even on *fresh* ani-
 mal food, would induce a putrefactive state
 of the body, with as much certainty, and
 perhaps in a shorter time, *without the use of*
salt, than when salt is moderately used.

The advance towards putrefaction, and
 the saline state of the fluids in scorbutics, the
 Doctor thinks, seem to consist in the pro-
 duction

duction and evolution of a saline matter by the animal process.—He says,

“ That this saline state is constantly in
“ some measure produced and evolved by the
“ animal process appears from this, that
“ certain excretions of saline matter are con-
“ stantly made from the human body,
“ and are therefore presumed necessary to
“ health.”

It appears evident to me that the saline state of the blood in scorbutics, and the other phenomena which have been mentioned, may be accounted for without attributing them to the effects of sea salt.—However, as it is not my intention to enter into any such discussion, I shall only mention that the quantity of fixt alkaline salt taken in with the food ; and the check given, *in scorbutics*, to the evacuation of the saline particles of the fluids by perspiration, &c. may be considered as two powerful causes of the production of a preternatural quantity of saline matter, (if such really does exist) in the blood of scorbutics. Interrupted or obstructed perspiration, is not only a cause, but an effect of Scurvy. Perspiration is commonly checked by the application of cold or moisture to the body ; and the

the saline matter, which ought to be carried off from the mass of circulating fluids, by the cuticular discharge, being retained; will greatly contribute to the production of Scurvy.—And when the disease is actually formed, the perspiration is diminished in proportion to the languor of the circulation in the minute cutaneous vessels; and to the debility of the circulating powers.

To the above circumstances we may add, that, when a person actually has the Scurvy, neither chylication, sanguification, nor any of the animal processes or functions, are in a healthy state; therefore it cannot be supposed that either the salts, oils, or other constituent parts of his fluids can be so intimately mixed and blended together, as in a state of perfect health.—For these reasons it is probable, that in examining the state of the blood taken from scorbutics, a deception has arisen, from the uncommon separation of the constituent parts of that fluid.

Dr. Cullen concludes what he chose to say on the subject, thus:—

“ I have only to add, that if my opinion
 “ in supposing the proximate cause of Scur-
 “ vy to be a preternaturally saline state of

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“ the blood be at all founded, it will be suf-
 “ ficiently obvious, that the throwing into
 “ the body along with the aliment an un-
 “ usual quantity of salt, may have a great
 “ share in producing the disease. Even
 “ supposing such salt to suffer no change in
 “ the animal body, the effect of it may be
 “ considerable; and this will be rendered
 “ still more probable, if it may be presumed,
 “ that all neutral salts, consisting of a fixed
 “ alkali, are changed in the animal body
 “ into an ammoniacal salt, which I apprehend
 “ to be that especially in the Scurvy.”

What has just been stated is the opinion
 of one of the first medical characters of the
 age; therefore is entitled to the greatest de-
 ference and attention.—And although I am
 not thoroughly satisfied with his doctrine of
 the proximate cause of Scurvy; yet, I
 think it has this to recommend it, that it is
innocent; and that it is not likely to produce
 those pernicious consequences which an op-
 posite doctrine might occasion.

Dr. Fletcher endeavours to confirm the
 opinion of Dr. Cullen, with regard to the
 bad effects of salt taken into the body.—In

his remark on Dr. Cullen's opinion, as before stated, he says,

“ The above opinion of Dr. Cullen will
 “ appear still better founded from these cir-
 “ cumstances ; that the lower class of peo-
 “ ple, inhabiting the north of *Ireland*, *Scot-*
 “ *land*, and many of the sea-port towns, and
 “ living chiefly upon fish, which though
 “ not salted above six months, imparts ne-
 “ vertheless to those people evident symp-
 “ toms of the scorbutic *diathesis*. But this
 “ Scurvy is prevented rising to any confide-
 “ rable height, by those people enjoying the
 “ benefit of the shore, and vegetable quali-
 “ fiers thence produced.”

If scorbutic symptoms should appear among those people ; a scanty, unwholesome diet, with bad cloathing, an almost constant exposure to moisture, with other causes, may account for them ; independent of the salt they may use.

The fact appears to be, that the class of people just mentioned are miserably poor.—Their extreme poverty and low living render them spiritless, indolent, and lazy ;—if they can but procure a miserable subsistence from

day to day they are satisfied, and seem to aim at nothing farther. They live in miserable, confined, huts; very few of them have any thing like a garden; and the few who rent small lots of ground, generally content themselves with planting them entirely with potatoes,—or, perhaps they may have a few greens some part of the year; but to the generality of them, greens, or any kind of esculent vegetables, *except potatoes*, are a rarity. If they cannot raise vegetables themselves, there are none to be purchased; for neither the landlords nor farmers, raise more than are barely sufficient for their own families.

These poor people, then, live almost entirely on fish, either fresh or salted; they rarely taste animal food; some part of the year they cannot even procure potatoes:—the oatmeal of which they make their bread is often procured with difficulty, and in general not in sufficient quantity; they seldom taste malt liquor, their usual drink being water; and they are much addicted to drinking drams of a cheap, but pernicious kind of ardent spirits, called *Whiskey*.

From

From the above description, which, I believe, will not be found exaggerated ; is it to be wondered at, if the blood and juices of those people should be in a thin, dissolved, acrimonious state ?—From a long continuance of such a mode of living, I am convinced this would be the case, even if they never used a particle of salt.

In the winter of 1765-6 the inhabitants of the Shetland Islands were greatly distressed for want of bread, occasioned by some misfortunes, but particularly by the loss of the trading vessel which usually brought their winter supplies of biscuit, oatmeal, &c. &c. from Leith.—The consequence was, that the poor fishermen, and others of that class, had not a bit of bread for themselves or families the whole winter ; until a vessel arrived with a supply in May.—The quantity of potatoes and other vegetables on the islands was but small ; and the landlords, &c. whose property they were, of course kept them for the use of their own families. The winter happened to be uncommonly severe, and the poor people were obliged to live almost entirely on fish and sea-weeds.

The ship I then belonged to, happened to be stationed at Shetland the following summer; therefore I received particular accounts of the distresses of these poor people, from some of the most respectable inhabitants.—The kind of fish which they chiefly used, was what the Shetlanders call Piltocks; they are the young Cole-fish; or what Naturalists call the *Afellus Niger*.—They are rather a dry, poor fish; for which reason the people supposed they agreed better with them when eat only with salt, and without any kind of vegetable diet, than richer fish would have done;—and this is probable.

These young cole-fish are found in vast numbers close to the shore in all the harbours; and the poor people in general, use them very much all the year.—They always eat them fresh, but use a considerable quantity of salt with them.

Now, as I was credibly informed that a great many poor families lived, that hard winter, almost entirely on those fish, with which they used a considerable quantity of salt; and on sea-weed, which they used either raw or boiled, it must be supposed that they took in a considerable quantity of salt in the

the course of the winter ; yet there was not the least appearance of Scurvy among them.—Had they lived all this time, either on meat, or fish, *salted* ; and had, *in this way*, taken in an equal quantity of salt without bread, or other correctors ; I have no doubt but many of them would have been afflicted with the Scurvy.—And this would, the more probably have happened, as the inhabitants of those islands are much exposed to humidity in the winter, from frequent fogs, &c. and to other causes of Scurvy, as want of cleanliness ; indifferent cloathing ; and damp uncomfortable habitations.

The manner of living of these people, is nearly the same every winter, except that they in general can procure oatmeal for the purposes of making bread, porridge, &c.—I happened to be four succeeding summers on that station ; and as there was but one medical man, at that time, settled in Shetland ; I was each summer consulted by great numbers of poor people from every part of the islands, for variety of complaints ; but never saw any appearance of the true Scurvy.

Dr. Fletcher next remarks, “ We are
 “ also informed, (I think in the Voyage of
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“ the Resolution) that a people inhabiting a
“ part of South America (nearly in the same
“ latitude of England,) came off with a
“ quantity of blubber, and guts of putrid
“ fish wrapped round them, which they
“ would frequently apply to their mouths
“ with great satisfaction ; those people stunk
“ so abominably, we are told, that they
“ could not be suffered on board, yet they
“ seemed sprightly, and free from cutaneous
“ defects. It does not appear from the
“ above, that those people regarded the use
“ of salt.”

The circumstance of these people coming off with the blubber and guts of putrid fish, is no proof that they do not use salt, when on shore. If saline springs are as common where these people inhabit as they are two or three degrees to the northward of them ; and almost all along the Patagonian coast ; they must necessarily take in a considerable quantity of salt, with the water they drink.— But whether we are expected to conclude that these people “ seemed sprightly and free from “ cutaneous defects,” because they frequently applied the blubber and guts of putrid fish to their mouths ;—or whether we are to think

think it extraordinary, that under the circumstances described they should be sprightly and free from cutaneous defects, I cannot determine ; however, I do not see that in either case this remark tends to confirm the opinion of Dr. Cullen.

“ And lastly, the inhabitants of the torrid zone, many of whom live on vegetables, and consequently use little or no salt, are free from scorbutic affections.—The natives drawn from the sea-coast to the inland parts, have no particular place of abode, but live under the shelter of trees, which afford them food as well as habitation ; and when the fruit is consumed in one spot, they remove to another ; and this picture answers to numberless places in the torrid zone.”

The picture which has just been drawn may give us some idea of the Golden Age ; or of the mode of living in the times of the patriarchs ;—but I can see no reason why our admiration should be excited, because people who live on vegetables and fruits, should be free from scorbutic affections ; even if they were so imprudent as to *use a little salt*.—The mode of life just described,
appears

appears to be exactly that which one would recommend to a poor seaman, afflicted with Scurvy; and happy would he be to enjoy it, till he got rid of his distressing complaint.

Dr. Fletcher next informs us, in order the more effectually to establish the opinion of Dr. Cullen, that “ the Marian, or Ladrone Islands, are extremely populous and healthful: the inhabitants living on roots, fruits, and (fresh) fish; the same also of the inland negroes, they make but one meal in the day, which is in the evening: their diet consists of rice, fruit, and roots. The Island of Otaheite, we are told, is healthy, the people tall and well made, and by temperance and a vegetable diet, they live to a good old age, without any considerable ailment: there is no such thing known among them, as rotten teeth; and the very smell of wine, or spirit is disagreeable; in many places *Indian* corn is the chief nourishment. The inhabitants of Biledulgerid, and the Desert of Zara being temperate, and strangers to the diseases of luxury and idleness, generally live to a great age; sixty with them is the prime of life. And the inhabitants of
“ Ma-

“ Madagafcar will travel two or three days,
 “ without any other food than a sugar-cane.
 “ All these nations employ *little or no salt* in
 “ their food, and there cannot be any other
 “ reason well assigned, *why Scurvy is not*
 “ *among the number of their diseases.*”

That the inhabitants of one country living on *roots, fruits, and fresh fish*;—those of another living on *rice, fruit, and roots*; and that the people in a healthy island, and a fine climate, living on a vegetable diet, *without wine or spirits*; should not only be free from Scurvy, but in general healthful; I confess does not surprize me so much, as if the contrary had been asserted to have been the case.—For the manner of living just described, appears to be as likely to *prevent* the Scurvy, as any that could be adopted; and as these people are accustomed to it from their infancy, it is the more likely to agree with them. Can it be supposed that if these people used a moderate quantity of salt with their food, they would be the more unhealthy or more liable to become scorbutic on that account?—I believe, the fact is, that they do use salt; and would probably use more, if the nature of their food required it.

I hope

I hope I shall be excused for dwelling so long on this subject ; but as I have presumed to suspect the orthodoxy and infallibility of the justly celebrated professor's opinion, it appeared necessary to explain my reasons for such presumption.—And if a single case can be given of the production of Scurvy in a person living on good, fresh, animal food ; with a proper proportion of bread, and recent vegetables ; accompanied with the most liberal use of pure salt ;—and if it can be made to appear that the salt was the cause of the disease :—this single instance will have more weight, and will prove the pernicious effects of salt, more than the most ingenious speculative reasoning.

I shall here relate the particulars of some well authenticated cases of the true Scurvy, in the production of which salt cannot be supposed to have had the smallest share.

In the second volume of the Medical Transactions, published by the College of Physicians in London, there is a remarkable case given by Dr. Donald Monro, of a young man betwixt nineteen and twenty years of age, who boarded in a tradesman's house in London, where he had “ Tea and bread
“ and

“ and butter for breakfast ; broth or fish,
 “ and boiled or roasted meat with greens or
 “ roots for dinner ; and bread and cheese, or
 “ water gruel, or cold meat, for supper ; and
 “ small beer for his common drink.

“ About the middle of December 1767
 “ he caught a bad cold, used but little exer-
 “ cise, and staid much at home.

“ In the beginning of January 1768 he
 “ felt a heaviness and lassitude all over ; was
 “ apt to fall asleep as he sat in his chair, and
 “ found that the least exercise fatigued him
 “ much.—On the 13th of February he per-
 “ ceived a little swelling of his gums, and an
 “ uneasiness about his lips and cheeks, spit-
 “ ting of blood, &c.”—It would be tedious
 to relate all the circumstances of the case,
 therefore I shall only say, that when Dr.
 Monro first saw him on the 14th of Febru-
 ary, besides a quick, full, pulse, he had sever-
 al vesicles full of blood on the inside of his
 lips.—The uvula, velum pendulum palati,
 the roof of the mouth, and surface of the
 tongue were black ; and the inside of the
 cheeks covered with large black spots. Be-
 ing hot and costive, he was blooded, took sa-
 line draughts with nitre, and an opening
 draught

draught next morning.—He continued the cooling draughts, and frequently washed his mouth with a proper gargle, till the 17th; when Dr. M. finding that his patient had had a considerable discharge of blood from his nose and mouth; that there was a vesicle full of black coagulated blood as large as the end of one's thumb, at the orifice which had been made with the lancet; his mouth continuing black, &c.—From all these appearances, and other symptoms of Scurvy which are mentioned, he began to suspect that the disorder was of the true scorbutic kind; he therefore ordered him to live almost entirely on a vegetable diet; “to eat
“daily five or six China oranges;” to use barley water with lemon juice for his common drink; to take gum arabic and nitre; decoction of bark with saline draughts, vitriol drops, &c.

Finding the symptoms continue, or rather increased, on the 20th; and apprehending from the rapid progress of the disease that the patient might sink under it; he begged the favour of Mr. John Hume, one of the Commissioners for the Sick and Wounded in his Majesty's Navy, who had served many years
as

as a Surgeon to a Man of War, to go with him, and to give his opinion of the case.—

“ Mr. Hume, after examining every circumstance, gave it as his opinion that the disorder was of the true scorbutic kind.”—

Mr. Hume recommended a perseverance in the same kind of regimen ; and to take as freely of the medicines as his stomach would bear ; by which means all the scorbutic symptoms were gone by the 13th of March.—But the diet was continued three weeks longer.

The Doctor saw him a twelvemonth afterwards, and was told he had remained in good health all that time.

I am sorry that Dr. Monro has not favored us with his opinion of the cause of the Scurvy in this patient.—It is not probable that it should proceed from the nature of his diet ; which seems to have consisted of a sufficient variety of good wholesome articles of food ; and we are told he had been accustomed to live nearly in the same way in the country.—As there is no mention made of salt, that article seems to be out of the question.—It may be asked then, whence could this violent scorbutic affection arise ?

To

To this question I should not hesitate to answer, that it must have arisen from the most common of all causes of Scurvy, namely, *Defective Nourishment, Obstructed Perspiration, and the Want of proper Exercise.* For although, in this case there was plenty of good wholesome food ; yet, there must have been some fault in the organs of digestion or chylication ; in consequence of which, the blood and other fluids of the body were deprived of the due supplies of fresh chyle, which are absolutely necessary to prevent their degeneracy.—For it is well known that animal fluids as well as solids, have a natural tendency to become putrid ; and this tendency to putridity in the fluids of a living animal can only be restrained, and prevented arriving at that degree of putrescency which is incompatible with health, by being constantly renewed and changed by a continual accession of fresh chyle, formed from adequate supplies of nourishing food.

When the body is regularly and sufficiently supplied with wholesome food ; and digestion, chylication, and all the secretions and excretions are duly performed ; the fluids are not only renewed ; but those parts of
them

them which perhaps have been longest in the circulating mass, which are become useless, or acrimonious and nearly putrid, are carried off by perspiration; and the other outlets of the body.

From what has just been said, we may conceive that perspiration may be greatly checked by defective nourishment, independent of the application of cold;—and when that is the case, it is evident what mischief must succeed in the human frame, from the acrimonious and putrescent particles of the fluids being retained, instead of being evacuated by the proper emunctories.—In such cases, they will act as a putrid ferment, or leaven; and by a regular process, (more or less rapid according to circumstances) will gradually assimilate the blood, and all the juices of the body, to their own nature, unless prevented by proper means.

The cause and rapid progress of the Scurvy in the above case, may I think be accounted for, from some fault in the digestive or chylopoietic organs which deprived the blood of the necessary supplies of fresh chyle:—and from the retention of the most putrescent particles of the fluids; or, what is

N

called,

called, perspirable matter; and both those causes might have been produced, or at least augmented, by the violent cold which the young man had caught.

In the same Volume of the Medical Transactions, there is “ An Account of two
“ Instances of the true Scurvy, seemingly occasioned by the want of due nourishment,
“ being an Extract of a Letter addressed to
“ Dr. Baker, by Francis Milman, M. B. Fellow of Exeter College, in Oxford, and one
“ of Dr. Radcliffe’s travelling Physicians.”

In the account given of these cases, it appears that two unmarried sisters, the one aged forty, the other forty-two years; who lived together “ on the high and sandy heath
“ of Brandon in Suffolk;” became highly scorbutic.—The symptoms were progressive from extraordinary lassitude and inactivity, to the most distressing degree of Scurvy; and as “ they neither had lived in a cold,
“ moist air, nor in a low country; nor had
“ salted meat been their food;” Dr. Milman was at a loss, at first, to what cause he ought to attribute these complaints; particularly as “ the circumstances, which had attended
“ these poor persons were very different from
“ what

“ what are held to be the ordinary causes of
“ that disease.”

However, on inquiry into their way of life, his difficulties were lessened.—“ I found
“ that for several months, previous to their
“ illness, they had lived entirely on an infusion
“ of the common Bohea Tea, without milk or
“ sugar ; and bread, without any other addition
“ to their diet whatever.”—The very sensible and judicious remarks which Dr. Milman has made on the above cases, are highly worthy of attention.

In the thirteenth Volume of the Medical Commentaries of Edinburgh, there is “ An
“ Account of a Case of Scorbutus occurring
“ on shore, and terminating successfully, by
“ Mr. John Leeds, Surgeon, Hemington,
“ Suffolk.”

The patient was a woman of seventy-five years of age, with spongy, putrid gums, contraction and pain about the flexor tendons of the hams, a remarkable livid appearance on the thighs, diffused to a considerable extent, and marks of extreme debility in the system.

The causes of the production of scurvy in this case, appear to be “ impure air, a

“ sedentary life, and the use of food not
“ easily assimilated into chyle, or, at least,
“ not into such as was sufficient properly
“ to answer the purposes of nutrition. The
“ impaired and weakened state of the vital
“ powers, in consequence of old age, had
“ likewise probably no small share in fa-
“ vouring a disposition to such a disease.”

In the twelfth volume of the Medical Commentaries of Edinburgh, there is “ A
“ Letter from Dr. Matthew Guthrie, Phy-
“ sician at St. Petersburg, to Dr. Duncan,
“ on the Effects of a cold Climate on the
“ Land Scurvy, &c.” in which Dr. Guthrie
says he has seen “ the true sea scurvy raging
“ on dry land, in all its menacing forms,
“ and filling the hospitals of Petersburg
“ and Cronstadt with its martyrs; as the
“ aid of medicine did but very little to con-
“ fine its destructive rage.”

“ This extraordinary phenomenon ap-
“ peared in the winter of 1785, and was
“ found to have proceeded from a want of
“ those very prepared vegetables on which
“ I supposed their safety to depend; the
“ crop of cabbage, cucumbers, carrots, tur-
“ nips, &c. having failed that year, inso-
“ much

“ much as to raise the price of the few gathered much too high for the pay of the land and sea troops; and it was just among this description of men that the disease obtained.”

In the same volume there is “ A Letter from Dr. William Brown, Physician at Kolyvan in Siberia, to Dr. Guthrie of St. Petersburg, giving an Account of the Scurvy which prevailed in Russia in 1785.”

Dr. Brown, in the above letter, gives a particular account of the symptoms, &c. of the true scurvy raging amongst the troops, that had not been from home, as it appeared in the hospitals of Petersburg and Cronstadt.

On account of the dreadful ravages occasioned by the scurvy in Russia, at the above period, it was necessary to employ additional assistants at the hospitals. And we are told by Dr. Bacheracht,* that this disease prevailed

* *Memoire sur le scorbut, pour l'usage des chirurgiens de l'armée et de la flotte Imperiale Russe. Traduit de l'Allemand sur l'original du Docteur Henri Bacheracht, Conseiller de College et premier Medecin de la flotte Imperiale.*

both at Petersburg and Cronstadt to such a degree as to require the particular attention of Government; and that the salutary orders which were issued in consequence of this had the effect of snatching from death a great number of those unfortunately affected with it, and of restoring them to health.

Dr. Bacheracht in his *Memoire* considers humidity as the principal circumstance which may be considered as the predisposing cause of scurvy. But that it will not, by itself, produce the disease, unless other causes concur to give activity to the effects which it produces. The chief occasional causes, he thinks, are a long and cold winter, aliments of a bad quality, excessive and long-continued fatigue, the want of proper cloathing, ill constructed lodgings, and the excessive use of spirituous liquors. These occasional and predisposing causes produce, he supposes, in the body a certain vitiated disposition, which may be called the scorbutic cachexia, and which may equally take place at sea or on shore,

There is likewise a case of true scurvy happening on land, in the fourteenth volume
of

of the Medical Commentaries, by Dr. Thomas Fowler, member of the Royal Medical and Physical Societies of Edinburgh, and of the Medical Society of London.

The patient was a mantua-maker, aged twenty-eight years; she had livid spots on her arms, breast, lips, &c. spongy, livid, and bleeding gums, bloody urine, dyspnoea, and foetid breath.

Dr. Fowler attributes the disease in this case to a scorbutic, melancholy habit of body; sedentary mode of life; asthmatic state of lungs; and in particular to her having previously had a slow fever.

In the second volume of the London Medical Journal there are “two cases of scurvy attended with uncommon circumstances, by Mr. William Coleman, surgeon at Sandwich in Kent.”

These patients were both females, from whose mode of life there could not be the smallest reason to suppose that salt or salted meats could have any share in the production of their complaints.

Many other instances of the scurvy might be produced, the causes of which could not

be attributed to salt, taken in any form whatever.

I shall only add one at present, which is the case of a lady at this time under my care.—When I first visited her, (ten days ago) she complained of languor, lassitude, and great debility ; — her respiration was short and difficult, particularly on using the least exercise ; — her countenance was pallid, fallow, and bloated ; or, she had what may be called the *facies scorbutica*, which those accustomed to the appearance of persons in this disease, will readily comprehend ; — her gums were spongy, and of a dark livid hue ; — her hams were stiff, after sitting some time had a sensation of being contracted, and after walking a few minutes became painful ; — her legs had an œdematous appearance, and retained the impression of the finger ; — she was capable of using but very little exercise, and when she attempted to walk, or exerted herself in the least, she became so languid and faint, and was troubled with such violent palpitations and oppression, that she was unable to support herself. — These, with foetid breath, and some other symptoms, left no room to doubt

doubt that her complaint was the true scorbutus.

Having received the most minute information of every particular relating to this case, I confess I was a good deal surpris'd to find this disease produced under circumstances so very unfavourable to it—some of which I shall mention. The patient is thirty-five years of age ; has been married, but never had a child ; has, in general, been very healthy, and has always had a good appetite.

From a dislike she took to animal food, she has not eaten any these five years and a half ; — during the last eight months she lived in a gentleman's family in the neighbourhood of Portland Place, as governess to his children ; although she was always up late and early, yet as she was employed in drawing and needle-work all the day, she led a very sedentary life ; seldom going out, or using any exercise except on Sundays ; when she walked to her brother's, at Chelsea, (where she now resides) and to town again in the evening.—Her usual food consisted of vegetables, milk, and puddings ; with bread and butter ; and tea, or coffee.—

Having a dislike to wine, she would not drink any ; but as they brewed spruce beer, and used it in common in the family where she lived, that was her usual drink.

However, the gentleman in whose family she lived, supposing, from her looks ; from evident marks of debility, and other circumstances ; that she did not take sufficient nourishment ; ordered that (as she would not eat meat) she might have broth or soup made every day for her.—But this was not sufficient to check the progress of the disease ; which, by this time, had got to a considerable height :—therefore she was obliged to retire to her brother's, is now much better, and in a fair way of recovery.

I recommended a more generous diet, consisting of a mixture of such articles of animal and vegetable food as contained most nourishment, and were easiest of digestion ; the liberal use of acid fruits, and of port wine and porter, with as much exercise in the open air as she could bear without fatigue.—As to medicine, she took aq. ammon. acetat. ʒss. & vin. antim. gtt. xx. with a basin of wine whey at bed-time ; and in the course of the day she took three or four

doses

doses of the bark, and rhubarb sufficient to keep the body open.—After a few days, finding the oppression and difficulty of breathing still troublesome, particularly on going up stairs, I added to each dose of the bark, gum. myrrhæ pulv. Kali ppt. ā gr. xv.—In five or six days from the time she first began to take medicine the swelling and œdematous appearance of her legs entirely disappeared, all the other symptoms were better; and instead of being fatigued with walking five or six minutes, she could walk half an hour without difficulty. She still continues the same plan, and her health improves daily.—Like all other scorbutics she is fond of lemons, and can eat several daily, without inconvenience.

Here then is an instance of true Scurvy, in which but few of the circumstances usually deemed occasional causes seem to have been at all concerned.—Spruce beer and a vegetable diet are generally esteemed among the most powerful antiscorbutics—yet we see that in this case, they were not sufficient to prevent the disease, even where neither salted meat, humidity, cold, want of cleanliness nor a melancholy disposition could be supposed to
 coun-

counteract their salutary effects. How then, is the disease to be accounted for in this case? There appear to be but two causes from which we can account for such effects in the present instance; and these are, defective nourishment and the want of regular and sufficient exercise: for although there are many instances of people living on a vegetable and milk diet, and enjoying good health; yet, by much the greater part of mankind, particularly in high latitudes, require food of a more nutritious quality, and what will not pass off too readily by the different emunctories; for these reasons, as has been observed before, a due mixture of animal and vegetable diet is the most wholesome and proper for mankind in general.

There is another circumstance perhaps rather peculiar to this patient, which ought to be mentioned.—She had a very uncommon quantity of hair on her head; for besides being remarkably thick and strong, it measured six feet in length.—It is probable this might have been an additional cause of debility.

If I am right in my conjecture of the causes of Scurvy in this case, the manner

ner in which they probably operated in producing the disease, may be understood from what has been already said.

This case, as well as some others which have been mentioned, seem greatly to favour the theory of Dr. Milman.—But as it appears to me impossible to account for all the phenomena of Scurvy, on the principles laid down by that gentleman, any more than by those of any other theory that I know of; I must conclude, that the subject is by no means *exhausted* (as has been supposed by some) neither in the theoretical nor practical parts.

The Scurvy still being the scourge of long cruizes and voyages, is a proof that we are not yet arrived at that perfection in its prevention and cure, which is greatly to be desired.—And, as it is evident from what has been stated, that it is produced by different, and apparently opposite causes; and under variety of circumstances; it appears to me that any theory that will explain and account for all the phenomena of this disease, must be very comprehensive indeed.—Its symptoms being so numerous, so various and complicated in different people and constitutions,
that

that unacquainted as we still remain with many of the operations of the animal economy, the most ingenious theories of this disease, will, I fear, leave us in doubt and uncertainty.

There have been instances of the Scurvy among the crews of Indiamen, where they lived entirely on rice.--And, I am sorry to say, that even wort, which has been boasted as a specific in this disease, will neither prevent nor cure it, unless assisted by fresh vegetables or fruits.

A gentleman who is now a lieutenant in his Majesty's navy, and who commanded a ship last year on the Southern Whale Fishery, informed me, that not only his people, but he himself, became scorbutic during the voyage; notwithstanding great care had been taken in salting the meat, and furnishing the ship with the best provisions of every specie; so that even when they returned to England, their provisions, of every kind, were sound and good; but particularly their biscuit, which had been kept in tight casks.

They were likewise provided with a considerable quantity of good malt; which, as soon as the Scurvy began to make its appearance,

ance, they used very liberally, not only by drinking its infusion, but by stewing it, and cooking it in different ways :—and although they were a good deal on shore at Port-Desire, Penguin Island, &c. on the Patagonian Coast, yet, as there were no fresh vegetables of any kind that they could use, they could not check the progress of the disease.

We are indebted to the ingenious and benevolent Dr. Macbride for the introduction of malt as an anti-scorbutic, and, from the reports made by Mr. Young, surgeon of the *Jason*, and others, it was justly esteemed a most valuable accession to the list of anti-scorbutics :—but, after numerous and repeated trials, it has been found to fall greatly short of the expectations which had at first been formed of its effects in preventing and curing the Scurvy. Even Captain Cook, who gave his testimony in favour of wort, found that it would not cure the disease, in its advanced stages.—There are several cases of Scurvy related by Dr. Clark, when surgeon of the *Talbot*, East Indiaman *, where-

* Observations on the Diseases in long Voyages to hot Countries, 1773.

in wort had a very fair trial, but was found ineffectual. And some of the navy surgeons who tried it both in the East and West Indies, in the late war, seemed to think it of little use.—For these reasons, and others that have been mentioned, I must once more express my earnest wish, that the means of preventing this fatal disease, which have been pointed out in the preceding pages, may be put to the test, by one or more fair trials, *on a liberal plan*; and I have not a doubt but they will be found effectually to answer, not only in obviating Scurvy, but fevers and fluxes will likewise thereby be rendered less frequent; as those diseases often derive their source from a Scorbutic Diathesis.

To what I have already said on the * subject of admitting sea water into ships for the purpose of cleansing the well, &c. I wish to add, that when it unavoidably happens that the bilge-water becomes offensive; instead of letting in a little water every day, and pumping it out again, as is generally done; it should be suffered to run constantly,

and the pumps should be kept working as long as any offensive smell remains; and, after the cock is turned, and all the water pumped out, the stoves and fires ought to be used in such manner as to dry up and evaporate all humidity, as much as possible.

Dr. Fletcher, whose work I have already quoted, has, among other useful observations and proposals, recommended Orchards and Gardens, under the appellation of *British Naval Gardens*, for the use of seamen in *tropical* climes.—As this is a new idea, I shall here give an extract from what he has said on this subject.

“ The next thing which I shall observe
 “ upon, as being connected with the diet of
 “ seamen, is a circumstance of no small im-
 “ portance to their health; and what has
 “ hitherto, I should think, not occurred to
 “ thought, as being, perhaps, a *luxury*
 “ which *seamen* are by no means entitled to;
 “ I mean a *Fruit Garden* for the use of
 “ *sailors* in tropical stations, under the appel-
 “ lation of *British Naval Gardens*, and
 “ stocked with the various roots and fruits
 “ which are eat in those climes. This
 “ would be *Noble! Political!*—Methinks I
 O “ hear

“ hear the conversation of those happy people, as they recreate themselves in these gardens to this effect—“ God blefs our *Royal Master* ! who not only takes every means to keep us in health and spirits, but who has also made ample provision for us when out of both ! Who would be *Pressed* into such a service ? Who would not *voluntarily* fight his battles ? ” —
“ It is a melancholy consideration ! but no less true, that a fleet may be stationed three years in the *East*, without the *men* being ever able, in the course of that time, to come at the fruits of that country. How can they do it ? It has been observed that they have not the means, though these fruits are found to be *essentially necessary* to health—The very best antiscorbutics, preventing the blood from degenerating, and in these climes there being a natural appetite for them.

“ I protest, I think there is a cruelty in with-holding from the men, the free use of ripe fruits, in hot climates, equal to that of the ancient physicians prohibiting all kinds of diluting drink to their patients in ardent fevers.

“ Such

“ Such gardens as I am proposing, might
 “ easily be stocked with the various tropical
 “ fruits, which vegetate in most of those cli-
 “ mates, either spontaneously or with little
 “ culture. The shaddock, the orange, the
 “ lime, the pine, the banana and plantain,
 “ could not fail of proving highly grateful
 “ and salutary. The pumpkin and yam
 “ likewise would be found highly service-
 “ able. The former made into a pudding,
 “ with flour and sugar, and boiled with the
 “ addition of a little of the acid of tamarind,
 “ would prove equal in taste and flavor to
 “ that made with apples.”

It was not my intention to take any far-
 ther notice of the different Theories of
 Scurvy, which have lately been advanced,
 than just to mention them;* and leave
 to others to determine which is the best
 founded; and from which the various
 phenomena of the disease can most readily
 be accounted for. But as I have been led to
 make some observations on the effects of
 salt in producing the Scurvy, and did not
 then finish what I had to say on the subject;

* See page 24.

I shall in this place remark farther, that as Dr. Cullen has given it as his opinion that *salt taken in any way* is a principal cause of Scurvy; and Doctors Lind and Milman endeavour to prove that *salt and salted meats are innocent*; it might be of use in practice, if we could ascertain which of these opinions is most to be relied on.—I confess I think both opinions wrong, *in part*; and that neither the causes, nor the phenomena of the disease, can be satisfactorily accounted for on the principles laid down by either of those learned authors. Perhaps, *the truth may lie between*.—However, I do not pretend to improve either of the theories, but shall endeavour to point out some circumstances, wherein they appear to be defective, or erroneous.

I have already proved by incontestible facts that the Scurvy has been often produced where neither salt nor salted meats could be supposed to be the cause. But, as salt is a most useful article, and is perhaps more extensively and generally used than any other, I shall just mention a few of its properties; which, though well known, have not, I think, been sufficiently attended to.

Salt, moderately used, assists digestion, not only by gently stimulating and exciting the action of the stomach ; but by promoting the solution of the food.

The experiments of Sir J. Pringle and Dr. Macbride shew, that although *salt*, when mixed with animal substances in a large proportion, prevent them from putrefaction ; yet when a small quantity is employed, it considerably accelerates the putrefactive process.—Whence we may conclude that the small quantity of salt usually taken with our food facilitates digestion, which has been supposed a kind of incipient putrefaction.

On the contrary, if an uncommonly large quantity, or too large a proportion of salt, is taken with our aliment, may we not reasonably suppose that it will not only harden the food, and retard its solution in the stomach ; but that, in its passage therewith through the intestinal canal, it may irritate and contract the mouths of the lacteals, so as to diminish the due absorption of the chyle ; and thereby deprive the blood of its wonted supplies?—If this is allowed, the next question is, whether, in consequence of the small quantity of chyle absorbed, a

diminution of the vital power in the living solids may not be induced, agreeably to Dr. Milman's system? Or whether the large proportion of salt, which enters the circulation with the diminished proportion of chyle, may not occasion a depravity of the humours, according to Dr. Cullen's theory?—Be that as it may, I cannot see on what principle salted meats can be said to be innocent, unless their use is accompanied with powerful correctors, and plentiful dilution.—Without these, I think that a long-continued use of salted meats must be injurious, not only from the large proportion of salt, but from the quantity of putrescent juices taken into the habit.

With respect to the effects of salt taken with fresh food; I do not think it probable that any person will ever, *through choice*, use so much salt in that way as to prove hurtful; particularly if he has it in his power to gratify the desires of nature, by diluting freely.—Common salt heats the body, and occasions thirst more than any other saline body; therefore, when too great a quantity is taken, nature points out the remedy, by the

the sensation of thirst :—by drinking freely, and the salt being diluted with a large quantity of aqueous fluid, the purgative quality of the salt is increased ; consequently it will remain a shorter time in the intestinal canal, a smaller quantity will be taken up by the absorbents, and that portion of salt which enters the circulation, being likewise much diluted by the same fluid, will be more easily and speedily carried off by the different excretions.—In this manner then, salt, whether it is capable of being assimilated with our fluids, or not, (a fact, I believe, not precisely ascertained) may be taken in considerable quantity, with impunity.--Hence we may conclude, that, if salt retained in the body is pernicious, plentiful dilution will be highly useful in promoting the expulsion of the saline particles.

The salutary effects of small quantities of salt on several species of animals have often been observed ;—and no pasture grounds fatten cattle so soon, as those, which, at times, are overflowed by sea water ;—this may be partly owing to the slime and mud, and partly to the salt, which is left behind. The most delicate mutton is fed in those situations where

the spray of the sea is carried by the winds, *e. g.* that, fed on the windward part of the West India Islands, is preferred to mutton fed on the leeward parts;—and for the same reason, mutton fed on the islands of Portland, Shetland, &c. is much esteemed.

A wonderful analogy has been observed betwixt animal bodies and plants; but I do not know that the idea ever occurred to any one, of comparing the effects of salt on these.—We all know that salt, when used in large quantity, will equally preserve animal and vegetable substances; and, when used in a small proportion with our aliment, will equally assist digestion, whether the food is of an animal or vegetable nature.—I shall now endeavour to shew, that the effects of salt are nearly analogous, when applied to *living* animals, and vegetable productions.

Salt, as has already been observed, is known to accelerate the putrefaction of animal and vegetable substances, when used in small quantities; but when in larger, to retard it.—Salt, applied as manure, is found either beneficial or hurtful, according to the quantity that is used. When used in a moderate quantity, it is found of great utility;

not

not that it is supposed to enter into the substance of vegetables as an aliment ; (for experiments have been made, which seem to prove, that no kind of salt can, of itself, become the food of vegetables ;) but it is supposed to act by reducing weeds, dried herbage, roots, &c. into a putrid, oily mass ;—and as oily composts are found to have a powerful fructifying quality, so salt moderately used produces a similar effect, and proves an excellent manure.

But, when salt is used in too large proportion, instead of accelerating the putrefactive process in vegetables, it preserves those substances from corruption ; it hardens and shrivels up the fibrous capillaries of the roots, whence they become unfit for absorbing nutriment ; and the fertility of the ground is diminished, or perhaps totally destroyed.

From many observations it appears that salt, when used in small quantities, is a good manure ; but when too freely used, is a poison to vegetables ;* hence the practice in Cheshire
of

*. That salt is possessed of this quality, was known in the very early ages.—From what we read in the Old Testament, the terms *Salt* and *Salt Pits* seem to
have

of laying a quantity of rock salt on a soil, which abounds with rushes and weeds; and this

have been used as symbols of barrenness.—See *Deut.* Ch. xxix. V. 23. *Judges*, Ch. ix. V. 45. *Zephaniah*, Ch. ii. V. 9.

Virgil, who seems to have had a tolerable knowledge of soils, for the age in which he lived, condemns a saltish soil as occasioning the degeneration of fruit trees; and admitting of no melioration from culture.

Salsa autem Tellus, et quæ perhibetur amara,
Frugibus infelix, (ea nec mansuescit arando,
Nec Baccho genus, aut pomis sua nomina servat)
Tale dabit specimen.——

Virg. Georg. Lib. ii.

Pliny says, that wherever fossil salt is found, that place is barren and unfit for vegetation.

The effects of sea-water are so well known, that I have not noticed them:—but shall just observe in this place, that I think I have seen considerable benefit arise from drinking sea-water in sufficient quantity to purge gently, twice or thrice a week, at sea; and bathing in it occasionally.—Taken as above, it appears to be useful not only by evacuating the intestines of their putrid contents, and thereby obviating the ill consequences of that constipation to which seamen are subject; but it likewise promotes the glandular secretions.

As a cold bath, it is useful not only by bracing and cleansing the skin of whatever filth may adhere to it,
and

this is found effectually to destroy every kind of vegetable.

On the same principle it may fairly be presumed, that the eastern part of Patagonia, or what is called the *Desert Coast* in South America; as well as some of the African and Arabian Deserts; owe their sterility to the salt, which actually abounds in their soils.

I have dwelt much longer on this subject than I at first intended; but having fairly stated, as they occurred, several circumstances by which we may form some idea of the effects of salt on the habit, I shall leave to others to make what conclusions they may think proper.

The learned Dr. Milman contends, that the proximate cause of the Scurvy is a dimi-

and thereby promoting insensible perspiration; but it acts as a general tonic; hence, the body is enabled to undergo more fatigue: the digestive organs are thereby assisted in subduing the viscid, gross aliment commonly used at sea;—and hence, sea-water, properly used, will be found of great use both as a preventive, and as a remedy in Scurvy.

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nution of the vital power ; and, as a proof of this, he says, that those are most liable to it, who are weakened by preceding diseases.

It has already been observed, and is generally admitted, that whatever debilitates the habit, predisposes to Scurvy.—But there are many exceptions to this, as the most apparently healthy, robust, and cheerful seamen, have frequently been the victims of this disease, without any previous indisposition, or apparent debilitating cause.—Indeed this has generally happened where the Scurvy raged to a great degree. But, if the disease is entirely owing to debility, how does it happen that the appetite is good, and that the stomach appears perfectly to perform its office, even in the last stage of Scurvy?—It must be allowed that a great degree of debility is always attendant on the Scurvy :—But is this debility analogous to that which is the consequence of fevers, &c. ? And if so, why are not tonics, such as the Peruvian bark, the cold bath, mineral acids, steel, &c. found to be the most certain and effectual remedies ? —Or, in what manner are we to account for this fact, that a few fresh lemons or limes will

will do more towards restoring strength to the body, than either of the esteemed tonics just mentioned, or even than all of them united ?

These points, as well as some others connected with the causes of Scurvy, have not yet been satisfactorily explained ; but, as I have neither leisure nor inclination at present, to attempt their discussion, I must reserve that part of the subject, till another opportunity.—Nor should I at this time, have offered my opinion respecting the doctrine advanced by Dr. Milman, (which is certainly very ingenious) but that I apprehend, if adhered to, it may have a dangerous tendency with respect to the Prevention and Cure of the Scurvy ;—therefore I think it necessary to guard young practitioners against that, and every other theory, however specious the reasoning may be, which is not supported by practical observations and facts.—And I shall only add, that it appears to me probable, that one peculiar state of the fluids may be produced by the combined action of two or more of the causes, which have been mentioned ; that this state
of

of the fluids is the proximate cause; and that, from the action of *these fluids* on the solids, all the phenomena of the Scurvy may be accounted for.

THE END.

